



Distribution of Exotic Plants in the N. Rocky Mountains by Environmental Type and Disturbance Condition

T Weaver

T Weaver, D Gustafson, J Lichthardt, and B Woods 1989. Distribution of exotic plants in the N Rocky Mountains by environmental type and disturbance condition. MSU Biology Report #41, Montana State University, Bozeman. 91 pgs.

Made available through Montana State University's [ScholarWorks](https://scholarworks.montana.edu)
scholarworks.montana.edu



MSU Biology Report # 41

DISTRIBUTION OF EXOTIC PLANTS
IN THE N. ROCKY MOUNTAINS
BY ENVIRONMENTAL TYPE
AND DISTURBANCE CONDITION.

Montana State University, Bozeman

MSU Biology Reports

T. W. Evans 41
no dup.
9.7.41

Final report on National Park Service-University of Wyoming sponsored research project: Exotic plants of northern Rocky Mountain environmental zones. NPS contract # CX125-4-A038.

T Weaver
with D Gustafson, J Lichthardt, and B Woods

Biology Department
Montana State University
Bozeman MT
59717

1 June 1989

MSU Biology Report # 41

DISTRIBUTION OF EXOTIC PLANTS
IN THE N. ROCKY MOUNTAINS
BY ENVIRONMENTAL TYPE
AND DISTURBANCE CONDITION.

Abstract

This report lists seventy-three exotic species found in a systematic sampling of major environmental zones of the Rocky Mountains between the Canadian border and central Wyoming. For each exotic it states the regional distribution, the environmental types (HTs) it occupies (% constancy), the disturbance conditions (DCs) it occupies (% constancy), and its dominance (in terms of % frequency and % cover) in each cell of the HT x DC matrix. Park managers need to develop policy with respect to legally noxious weeds, forage grasses (eg *Phleum pratense*, *Poa pratensis*, *Bromus inermis*, and *Dactylis glomerata*), and forage legumes (eg *Melilotus* and *Trifolium* spp).

Key words: exotic plants, weeds, *Bouteloua gracilis*, *Agropyron spicatum*, *Festuca idahoensis*, *Pseudotsuga menziesii*, *Populus tremuloides*, *Thuja plicata*, *Tsuga heterophylla*, *Abies lasiocarpa*, alpine tundra.

Biology Department, Montana State University, Bozeman MT 59717.

CONTENTS

Introduction.....	3
Methods.....	4
General results, discussion, and conclusions.....	6
Essays on the altitudinal and disturbance requirements of 73 exotic species listed alphabetically by scientific name.....	17
Abbreviated introduction to tables 3-75, ie instructions for their use.....	89
Index: List of common names and scientific equivalents as a finding guide for those unfamiliar with the scientific names.....	90

INTRODUCTION

Exotic invasion of the national park system should be minimized because the presence of exotics violates the park objective of demonstrating natural (precolumbian) vegetation. Exotics might have other detrimental effects. Some (eg noxious weeds and pasture grasses) might reduce plant diversity through competitive elimination of native plants. Competitive exclusion of host plants might in turn eliminate animal or fungal dependents. And it is sometimes suggested that production is lowered by the invasion of exotics.

Because exotic presence is detrimental, it is desirable to know where each species can grow and might spread to -- with introduction and without control. Specifically, what geographic region can the exotic occupy, what altitudinal zones can it occupy, and, in those zones, what disturbance environments can it occupy. Distribution maps (Forcella and Harvey 1980, Booth and Wright 1966, Hulten , Barkley 1977) show current distributions, but provide only a minimal estimate of potential exotic distribution because the species may not have dispersed to all suitable areas yet. Habitat type maps (eg Kuchler 1964), combined with a knowledge of the tolerances of specific exotics for conditions in each of those HTS, allow one to predict potential distributions. Finally, since some exotics are more able to tolerate competition than others, estimation of the fraction of a landscape in a habitat type which is available to an exotic depends on knowledge of the disturbance types invadable, eg. continually disturbed, primary succession sites, secondary succession sites, and near-climax sites.

It should be noted that even the distributions reported here provide only a minimal estimate of potential distributions for two reasons: First, although we have sampled in the areas most likely to have been inoculated, sites which lack the plant may lack it for want of seeding. And second, species which cannot now occupy a habitat type may be able to do so after new genetic varieties (ecotypes) develop.

The objects of this report are 1) to review the literature on the noxiousness and regional distribution of exotic plants, 2) to report observations on the altitudinal distribution of exotic plants in Glacier National Park, Grand Teton National Park, and the intervening range, forest and parklands, 3) to describe the distribution of each exotic among five variously disturbed zones, and 4) to describe the dominance of exotic species in various habitat type/disturbance zones.

METHODS

The object of our project was to build tables (Tables 3-75) showing the potential distribution and dominance of each major exotic species 1) in the major altitudinal zones (habitat types) of the northern Rocky Mountains and 2) in the major disturbance zones in each altitudinal zone (habitat type). Answers were interpreted from data from a ten times replicated, blocked, natural experiment in which the performance of exotic plants was recorded in five disturbance zones in each of sixteen habitat types.

The study area reached down the Rocky Mountains from Glacier National Park at the northern edge of Montana southward to Grand Teton National Park in west-central Wyoming. It included subranges (Big Belts, Little Belts, Gallatin, Absaroka, and Beartooth) loosely called "the Yellowstone Area".

We observed only altitudinal-disturbance sites which had a high probability of having been inoculated because of their predictive value. Given inoculation, establishment of an exotic in one altitudinal-disturbance cell predicts that the species will be successful in similar environments (altitudinal-disturbance cells) at other sites, when (if) propagules arrive. We chose study sites adjacent to long-established highways as most likely to have been inoculated, due to exposure to diverse vectors for long periods of time. To the extent that our sites had not been inoculated, our conclusions underestimate the invasiveness of the plants studied.

We sampled for exotics in approximately ten sites (Table 1) in each of sixteen habitat types which represent steps along the altitudinal gradient, represent the vegetation of the three parks, and generally represent the vegetation of the region. Habitat types (environmental types usually named for and identified by climax vegetation that occupies them, Daubenmire 1968a, 1968b, and 1970; Pfister et al 1977; Mueggler and Stewart 1980) were sampled instead of literal altitudinal zones, because climax communities are believed to be better indicators of recurrent environmental conditions than meters above sea level (Daubenmire 1968a, 1968b, and 1970; Huschle and Hironaka 1980). These habitat types (Table 1) include, from low to high altitude, dry grasslands (BOGR and AGSP), moister grasslands (FESC-FEID, ARWY-FEID, and ARVA-FEID), warm-relatively dry forests (PSME-SYAL and PSME-PHMA), warm moist forests (POTR, THPL-OPHO, TSHE-CLUN, and ABLA-CLUN), cool forests (ABLA-XETE, ABLA-ARCO, and ABLA-VASC), mountain meadows (FEID-AGCA), and alpine tundra.

At each of the ten habitat type sites sampled we observed exotic performance in a block of five subsites subjected to different types of disturbance (treatments). The roadshoulder plots of zone one had gravelly soil, runoff water, high pollution, and frequent trampling. Roadside ditch slopes had runoff water, pollution, mowing, and perhaps some herbicide application. Roadcut slopes, once bared to mineral soil, were healing by primary succession. In forested areas, areas at the edge of the road corridor cleared without drastic soil disturbance were healing by secondary succession. The fifth zone lay in undisturbed near-climax vegetation characteristic of the habitat type.

Observations of exotic plant performance under approximately eighty (sixteen environmental zones (HTS) x five disturbance types) environmental conditions were replicated approximately ten times. At each habitat-type site disturbance zone subsites were staked as five 1 x 25M plots parallel to each other in the shoulder, ditchslope, roadcut, cleared, and undisturbed zones. Tables 3-75 give three types of site-wide data designed to indicate the capacity of exotics to invade major habitat types. The number of sites in the habitat type is indicated (n). Plot constancy (pc) is the percentage of the sites where the species occurred in at least one of the five strip-quadrats. Site constancy (sc) is the percentage of the species seen in the sample area inside or outside the sample plots; while site constancy is non-quantitative it may demonstrate invasion capacity not shown by plot constancy. Zonal statistics following the site statistics suggest the capacity of exotic plants to spread into five disturbance zones of habitat types they have invaded. Zonal constancy (cn) is the percentage of sites with the exotic in which the 1 x 25M zone is infected. Each 1 x 25M zonal plot was divided into five 1x5M subplots to see how ubiquitous the exotic species were; zonal frequency (fq) is the percentage of the 1x5M plots on infected sites which are occupied. The tendency of a plant to dominate a site is given by the percentage of the ground covered by the species on site; to measure the percentage of the ground covered by species on site we recorded the plants hit by each of 75 pins lowered at regular intervals *** into the vegetation. The zonal cover reported is the average cover of the plant in the zone on infected sites.

RESULTS

Seventy-three exotic species were found along highways passing through relatively wild grasslands, forests, and tundra of the northern Rocky Mountains. While most common exotics of well-drained upland vegetation should have been recorded by sampling multiple sites in major habitat types, our list is undoubtedly incomplete because we were, at the least, unlikely to capture 1) exotic plants of very wet areas (eg water cress) or 2) plants whose ranges are small, but likely to expand dangerously (eg *Euphorbia esula*).

The species are discussed in seventy-three one-subject pages. The presentations are arranged in alphabetical order by scientific name. The species are also listed alphabetically by common name (Index, following Table 76.), with their scientific names, to provide easy access to the distributional data for anyone unfamiliar with the scientific names. Each presentation repeats the scientific name (paragraph 1), a common name (paragraph 2), and the family name (paragraph 3).

Each species presentation includes a table of basic supporting data and four interpretative paragraphs. The objectives of this presentation are reviewed below.

The first paragraph gives both the current regional distribution and the noxiousness of the subject species, as reported in the literature. The range might be stable or could be expanding rapidly (Forcella and Harvey 1980). Since many ranges are still expanding, an exotic absent from an area which contains a habitat type occupied by the exotic in a second area can be expected to be invaded if and when the exotic is introduced. For example, *Centaurea maculosa*, long important in western Montana, has crossed the mountains and is spreading rapidly in the foothills there. Note is made for all plants which are legally noxious anywhere in the Pacific Northwest.

The second paragraph describes the altitudinal distribution of the exotic in zones ranging upward from dry grasslands to moist grass-shrublands, dry forests, moist forests, cool forests, mountain meadows, and tundra. It is based on plot constancy (percentage of sites judged occupied on the basis of plot data). For example, some species are found only in dry grasslands (*Camelina microcarpa**, *Grindelia squarrosa*, *Kochia scoparia**, *Salsola kali*, *Sisymbrium altissimum**, *Sisymbrium loeselii**). Some species are found only in moist forests (*Artemisia absinthium*, *Chrysanthemum leucanthemum**, *Hypericum perforatum*, *Silene cucubalus*, *Trifolium agrarium*, and *Veronica officinalis*), and some species occur almost everywhere (*Bromus inermis*, *Phleum pratensis*, *Poa compressa*, *Poa pratensis*, and *Taraxacum officinale*). Asterisked species are poorer examples than unasterisked species. If these statements had been based on site constancy (sc), instead of plot constancy (pc), they would have been parallel, quantitatively larger, and slightly less precise.

The third paragraph compares species occurrence in sites within the same habitat type, but having different disturbance histories. For example, due partly to decreasing water availability, some plants of the dry grassland habitat types (BOGR and AGSP) are restricted to road shoulders, some extend into disturbed areas, and some even reach into near-climax vegetation. Mostly mesic grasses occupied the shoulder: *Agropyron intermedium*, *Agropyron repens*, *Dactylis glomerata*, *Festuca arundinacea*, *Medicago lupulina*, *Phleum pratense*, *Polygonum achoreum*, and *Setaria viridis*. Extending on into the roadcut are *Bromus inermis*, *Chenopodium album*, *Cirsium arvense*, *Grindelia squarrosa*, *Melilotus alba*, *Poa compressa*, and *Polygonum aviculare*. Invading even near-climax vegetation were *Agropyron cristatum*, *Alyssum alyssoides*, *Bromus japonicus*, *Bromus tectorum*, *Camelina microcarpa*, *Centaurea maculosa*, *Descurainia pinnata*, *Kochia scoparia*, *Lactuca serriola*, *Lepidium campestre*, *Medicago sativa*, *Melilotus officinalis*, *Poa pratensis*, *Salsola kali*, *Sisymbrium altissimum*, *Sisymbrium loeselii*, *Taraxacum officinale*, *Tragopogon dubius*, *Triticum aestivum*, and *Verbascum thapsus*.

The fourth paragraph indicates the tendency of exotic species to saturate a habitat-disturbance cell. Plot constancy (pc of the site statistics) tells what proportion of the sites in that habitat type (environment) are infected. The zonal statistics are calculated on the basis of infected sites, that is, zonal constancy (cn=% presence) is the proportion of infected sites in a zone which have the exotic; frequency (=ubiquity) is the proportion of subplots, at infected sites in a zone, with the exotic; and cover (cv) is the average proportion, of infected sites in a zone, which is actually covered by the exotic.

The table summarizes the data on which the narrative statements are based and any information in paragraphs two through four which is not deducible from it is bracketed []. The first column lists the habitat types (environments) studied; more information on these habitat types can be found in Mueggler and Stewart (1980, grasslands and shrublands), Pfister et al (1977 forests), Lynch (1955, aspen grovelands), Johnson and Billings (1962, alpine) and Bamberg and Major (1968, alpine). The second column provides site statistics, ie the percentage of the sites in a habitat type which are occupied (on a plot [pc] basis or on a total site [sc] basis), and the number (n) of sites sampled in that habitat type. The last five columns of the table summarize plant distribution in the habitat type by disturbance zone. Each column provides constancy, frequency, and cover data for a different disturbance zone: road shoulder, ditch slope, road cut, cleared, and near-climax. These zonal statistics are based on data from occupied sites only, since we want to determine what zones would be infected if propagules were available at the site. If one wished to discuss current infection rates-- rather than potential infection rates-- he could calculate appropriate data by combining data from plot constancy, number of sites, and the data provided for the parameter considered.

DISCUSSION

The objects of this report are, first, to list the exotics of major upland habitat types of the northern Rocky Mountains and, second, to describe the distribution of each species by altitudinal and disturbance zone. The individual reports which follow satisfy these goals. The following paragraphs point out species of which special note should be taken--especially in a wildland context--, elaborate on interpretations, and point out limitations of the data.

First, the limitations. Our data set may lack important species. First, some aggressive exotics may not have been introduced yet or aggressive ecotypes of exotics may not have developed yet. Second, aggressive exotics which are present may have been so recently introduced that they have not entered the areas sampled and could therefore not have been recognized by the methods used. Third, aggressive exotics may occupy habitat types which were not studied and therefore not recognized by our method; an example is the *Euphorbia escula* (leafy spurge) which is aggressively invading streamside habitats throughout the state.

Three measures of presence are presented for each species: constancy, frequency, and cover. The following paragraphs suggest conclusions that can be drawn from each measure.

We believe that constancy indicates the capacity of an exotic to disperse in the habitat type considered and that maximum constancy indicates the capacity of the exotic to disperse in the habitat type for which it is best adapted. If so, a high value tells us it will be difficult to exclude the species by quarantine. This belief is based on the assumptions that most of the exotics have had considerable time to spread, that climax communities are good indicators of physical-biological environments, and that habitat types so indicated are relatively homogeneous. Of the 73 exotics found in the study area, twenty-six (28,41,56) appeared in at least 90% (75%, 50%, 25%) of the sites in the habitat type for which they were best adapted. That is, at least one third disperse well enough to have occupied most sites in their most favorable habitat type since their introduction 50-100 years ago. These should be more difficult to exclude than species with lower constancies.

Frequency is a measure of ubiquity. It tells us how often a 1 x 5M plot will have at least one suitable site for establishment of the exotic. Numbers of species with maximum frequency over 75% (50%, 25%) are for the constantly disturbed shoulder 18 (35,45), the constantly disturbed ditch slope 20 (34,49), the primary seral road cut 7 (19,36), the secondary seral cleared 3 (7,12), and near-climax vegetation 3(6,16). Establishment of exotic species, was then, highest in the constantly disturbed shoulder and ditch sites and similar in them. Establishment of exotic species declined with declining disturbance. A few species can establish almost as well in climax as in disturbed vegetation. And, without control, these are the best candidates for intrusive membership in native communities. These include grasses (*Bromus japonicus*, *Phleum pratense*, and *Poa pratensis*), mustards (*Alyssum alyssoides* and *Lepidium campestre*), composites (*Lactuca serriola* and *Tragopogon dubius*) and a polygon (*Polygonum aviculare*). Species establishing well in native vegetation all disperse well; only *Lactuca serriola* (71% constancy) and *Lepidium campestre* (50% constancy) occur on less than 90% of the sites in the zone most favorable to them.

Cover indicates the tendency of a species to dominate a site which it can enter and it is, therefore, the best indicator of the potential impact of the exotic in a habitat type. The cover of every invading exotic species declined with decreasing disturbance (= increasing competition): numbers of species with maximum cover over 10% (5%, 2%) are, for the constantly disturbed road shoulder site 9 (17, 31), the constantly disturbed ditch slope 8 (20, 30), the primary seral road cut 3 (8,20), the secondary seral cleared zone 0 (1,4) and near-climax vegetation 1 (1,8). For brevity's sake we can condense our five disturbance zones to three disturbance zones: the continually disturbed (shoulder and ditch slope), the seral (the roadcut under primary succession and the cleared area under secondary succession), and the adjacent undisturbed near-climax vegetation. On constantly disturbed sites exotic species for which average cover exceeded 10% in at least one habitat-disturbance cell were *Agrostis alba*, *Bromus inermis*, *Bromus tectorum*, *Centaurea maculosa*, *Festuca arundinacea*, *Medicago sativa*, *Plantago major*, *Poa pratensis*, *Polygonum achoreum*, *Taraxacum officinale*, *Trifolium hybridum*, and *Trifolium repens*. On seral sites exotic species for which average cover exceeded 10% in at least one habitat-disturbance cell were *Bromus inermis*, *Melilotus officinalis*, and *Trifolium hybridum*. Only one species, *Poa pratensis*, dominated an undisturbed site to the extent of 10% cover (12% in the ARVA-FEID habitat type). Species having average cover over 2% in at least one undisturbed cell were *Agrostis alba*, *Alyssum alyssoides*, *Bromus tectorum*, *Lepidium campestre*, *Linaria vulgaris*, and *Poa pratensis*. Species dominating in native vegetation usually disperse well; only *Lepidium campestre* (50% constancy) and *Linaria vulgaris* (30% constancy) occur on less than 99% of the sites in the habitat type most favorable to them.

In summary, one might deduce from the above that the species potentially most detrimental to wildlands are those which disperse well, enter native communities, and are sufficiently competitive to occupy significant percentages to the ground area there. Mobile species can be identified by inspection of the maximum constancy column in Table 2; the mobility of a particular species in a particular habitat type can be determined from the individual discussion of that species (Tables 3-75). The ability of a species to enter any particular habitat-disturbance zone (its frequency) can be read from the account of that species (Table 3-75); its greatest invasive capacity is indicated in Table 2; and those species having a high capacity to invade at least one climax community are listed in a paragraph above. The ability of a species to dominate any particular habitat-disturbance zone (its cover) can be read from the account of that species (Table 3-75); its greatest dominating capacity is indicated in Table 2; and those species having a high capacity to dominate in at least one climax community are listed in the paragraph immediately above. This presentation emphasizes the capacity to enter and dominate climax communities. While this is inappropriate in landscapes where significant percentages of the area are covered by seral communities, the reader can extract parallel data for discussion of any other disturbance zone from the individual species tables.

CONCLUSIONS

We found seventy-three exotics in major upland habitat types of the northern Rocky Mountain National Park areas. At least a few more will be found in the exploration of less extensive habitat types. Others are still to be introduced. And still others could become important through development of better adapted ecotypes.

While some exotics (eg *Bromus inermis*, *Phleum pratense*, *Poa compressa*, *Poa pratensis*, and *Taraxacum officinale*) can occupy most habitat types, most exotics have more limited altitudinal distributions.

While some exotics invade and dominate near-climax communities (eg *Agrostis alba*, *Bromus tectorum*, *Phleum pratense*, and *Poa pratensis*), most appear primarily at roadsides. The capacity of grasses (*Agrostis alba*, *Bromus tectorum*, *Phleum pratense*, and *Poa pratensis*) to invade and dominate is under-appreciated. While our data do not support current the fears of forb (eg *Centaurea maculosa* and *Euphorbia escula*) invasion, these fears may be justified on the basis of the performance of these weeds in other areas.

ACKNOWLEDGEMENTS

Field sampling in Glacier and Grand Teton National Parks was done By Bryant Woods. Field sampling in the Yellowstone and intervening areas was done by Jaunita Lichthardt. The data was entered by B Wood and J Lichthardt and checked by T Weaver. Dan Gustafson prepared the programs used in most of the table building. T Weaver designed the tables and wrote the text. S Harvey and J Rumely provided critical and creative reviews of both tables and text. Field sampling and data entry were funded by National Park Service grant NPS-CX-1200-4-8038 and most of the synthesis was funded by T Weaver.

LITERATURE CITED

- S Bamberg and J Major 1968. Ecology of the vegetation and soils associated with calcareous parent materials in three alpine regions of Montana. Ecological Monographs 38: 127-167.
- T Barkley ed 1977 Atlas of the flora of the Great Plains. Iowa State Univ Press. Ames. 600 pgs.
- W Booth 1950 Flora of Montana I: Conifers and monocots. Department of Biology, Montana State University, Bozeman MT 59717. 232 pgs.
- W Booth and J Wright 1966 Flora of Montana II: dicots. Dept of Biology< Montana State University, Bozeman. 305 pgs.
- A Chase and A Hitchcock 1950 Manual of the grasses of the United States. US Government Printing Office, Washington. 1051 pgs.
- R Daubenmire 1968. Plant communities. Harper and Row, NY. 300 pgs.
- R Daubenmire 1970. Steppe vegetation of Washington. Wash Ag Expt Sta Technical Bulletin 62, Pullman. 131 pgs.
- R and J Daubenmire 1968 Forest vegetation of eastern Washington and northern Idaho. Wash Ag Expt Sta Technical Bulletin 60, Pullman. 104 pgs.
- F Forcella and S Harvey 1980 New and exotic weeds of Montana. Herbarium, Montana State University, Bozeman MT 59717. 161 pgs.
- L Hitchcock and A Cronquist 1973. Flora of the Pacific Northwest. Univ of Washington Press, Seattle. 730 pgs.
- G Huschle and M Hironaka 1980. Classification and ordination of seral plant communities. J Range Management 33: 179-182.
- P Johnson and W Billings 1962. The alpine vegetation of the Beartooth Plateau in relation to cryopedogenic processes and patterns. Ecological Monographs 32: 105-135.
- A Kuchler 1964. Potential natural vegetation of the conterminous United States. Amer Geographical Society Special Publication 36, NY. 154 pgs and map.
- D Lynch 1955. Ecology of the aspen grovelands in Glacier County MT. Ecological Monographs 25: 321-344.
- W Mueggler and W Stewart 1980. Grassland and shrubland habitat types of western Montana. USDA Forest Service Gen Tech Rept INT-66, Ogden UT. 154 pgs.
- R Pfister, B Kovalchik, S Arno and R Presby 1977 Forest habitat types of Montana. USDA Forest Service Gen Tech Report INT-34. Ogden, Utah. 174 pgs.
- C Reed and R Hughes 1970. Common weeds of the United States. Dover, NY. 463 pgs.

Table 1. Information on the habitat types studied.

Code ¹	Indicator species ²	Location ³	Sites ⁴	Zone ⁵				
				SH	DS	RC	CA	NC
BOGR-STCO	<i>Bouteloua gracilis</i>	Big Belt	7	7	7	7	0	7
	- <i>Stipa comata</i>	w ft hills						
AGSP-BOGR	<i>Agropyron spicatum</i>	Big Belt	8	8	8	8	0	8
	- <i>Bouteloua gracilis</i>	w ft hills						
FESC-FEID	<i>Festuca scabrella</i>	Glacier	10	10	10	10	0	10
	- <i>Festuca idahoensis</i>	e ft hills						
ARWY-FEID	<i>Artemisia tridentata</i> ¹	Teton	10	10	10	10	0	10
	- <i>Festuca idahoensis</i>	e valley						
ARVA-FEID	<i>Artemisia tridentata</i> ²	Teton	10	10	10	10	0	10
	- <i>Festuca idahoensis</i>	e valley						
PSME-SYAL	<i>Pseudotsuga menziesii</i>	B&L Belts	10	10	10	10	4	10
	- <i>Symphoricarpos albus</i>	Yellowstone						
PSME-PHMA	<i>Pseudotsuga menziesii</i>	Gallatin &	6	6	6	6	4	6
	- <i>Physocarpus malvaceus</i>	Yellowstone						
POTR	<i>Populus tremuloides</i>	Glacier	8	8	8	8	0	8
		e ft hills						
THPL-OPLO	<i>Thuja plicata</i>	Glacier	10	10	10	0	0	10
	- <i>Oplopanax horridum</i>	w ft hills						
TSHE-CLUN	<i>Tsuga heterophylla</i>	Glacier	10	10	10	10	10	10
	- <i>Clintonia uniflora</i>	w ft hills						
ABLA-CLUN	<i>Abies lasiocarpa</i>	Glacier	9	9	5	9	4	9
	- <i>Clintonia uniflora</i>	w ft hills						
ABLA-XETE	<i>Abies lasiocarpa</i>	Glacier	10	10	10	10	5	10
	- <i>Xerophyllum tenax</i>	mtns						
ABLA-ARCO	<i>Abies lasiocarpa</i>	Teton	10	10	10	10	10	10
	- <i>Arnica cordifolia</i>	mtns						
ABLA-VASC	<i>Abies lasiocarpa</i>	Teton	10	10	10	10	10	10
	- <i>Vaccinium scoparium</i>	mtns						
FEID-AGCA	<i>Festuca idahoensis</i>	Teton	10	10	10	10	0	10
	- <i>Agropyron caninum</i>	mtns						
ALPINE	Alpine	Beartooth	11	11	11	11	0	11
		plateau						

¹The vegetation type codes consist of four letters (two from the generic and two from the specific epithet) for two dominant species. In grasslands the species are codominants, while in forests the first species dominates the canopy and the second species dominates the understory.

²The names of those identifying species are spelled out.

³The mountain ranges sampled include, alphabetically, Absaroka (=Yellowstone), Beartooth, Big Belts, Gallatin, Glacier (=Rocky Mountains), Little Belts, and Teton (=Rocky Mountains). The Belts are north of Yellowstone, and the Beartooth is east of Yellowstone. (e=east, w=west, ft=foot, mtns=mountains)

⁴Number of sites sampled in the habitat type.

⁵Number of sites sampled in each of the zones appearing in each habitat type: shoulder(SH), ditch slope(DS), road cut(RC), cleared(CA), near-climax(NC).

Table 2. Regional ubiquity (constancy), local ubiquity (frequency), and dominance (cover) of exotic plants in their most favorable habitats in the northern Rocky Mountains. Maximum constancy is the constancy found in the habitat type with the highest constancy of that species; the following parenthetic number gives the number of habitat types which have the maximum constancy or a constancy within ten percentage points of it. The non-parenthetic number following is the number of habitat types with the highest constancy. The frequency and cover data are the highest average frequency (%) and cover (%) values observed for the species in any habitat-disturbance cell. The disturbance zones are road shoulder (sh), ditch slope (ds), road cut (rc), cleared (cl), and near-climax (nc).

Scientific name	Max const all zones	Freq by zone					Cover by zone				
		rs	ds	rc	cl	nc	rs	ds	rc	cl	dc
<i>Agrostis alba</i>	99 (1)	80	88	54	8	17	7	13	4	0	2
<i>Agropyron cristatum</i>	99 (1)	80	60	40	0	3	4	7	2	0	0
<i>Agropyron intermedium</i>	29 (2)1	80	60	0	0	0	0	0	0	0	0
<i>Agropyron repens</i>	50 (2)1	73	80	20	0	0	6	6	0	0	0
<i>Alopecurus pratensis</i>	20 (2)1	10	20	10	0	0	0	0	0	0	0
<i>Alyssum alyssoides</i>	99 (2)	66	54	49	60	75	0	1	0	0	3
<i>Arabis glabra</i>	90 (1)	20	40	60	4	10	0	0	0	0	0
<i>Artemisia absinthium</i>	50 (3)	36	4	4	4	0	0	0	0	0	0
<i>Berteroa incana</i>	17 (3)1	40	0	20	40	0	0	0	0	0	0
<i>Brassica kaber</i>	10 (1)	40	0	0	0	0	0	0	0	0	0
<i>Bromus inermis</i>	99 (8)	88	83	88	52	23	13	12	20	7	0
<i>Bromus japonicus</i>	99 (1)	20	20	50	0	30	0	0	0	0	1
<i>Bromus tectorum</i>	99 (2)	99	80	60	80	35	17	14	2	1	3
<i>Camelina microcarpa</i>	71 (1)	8	60	35	0	8	0	0	0	0	0
<i>Capsella bursa-pastoris</i>	30 (1)	20	40	0	0	0	0	0	0	0	0
<i>Centaurea maculosa</i>	99 (1)	84	80	60	3	20	14	17	7	0	0
<i>Cerastium vulgatum</i>	70 (1)	60	30	70	0	0	1	1	1	0	0
<i>Chenopodium album</i>	80 (1)	40	33	40	10	8	0	0	1	0	0
<i>Chrysanthemum leuchanth.</i>	99 (1)	58	60	36	0	0	3	7	1	0	0
<i>Cirsium arvense</i>	88 (1)	20	68	66	20	33	1	2	2	0	0
<i>Cirsium vulgare</i>	70 (1)	20	34	20	0	0	0	0	0	0	0
<i>Convolvulus arvense</i>	10 (2)	99	99	0	0	0	0	12	0	0	0
<i>Cynoglossum officinale</i>	40 (1)	20	60	0	0	0	0	0	0	0	0
<i>Dactylis glomerata</i>	99 (1)	15	20	15	0	0	4	9	5	0	0
<i>Descurainia pinnata</i>	99 (1)	60	80	28	40	10	0	1	1	0	1
<i>Festuca arundinacea</i>	20 (1)	17	40	32	0	36	0	13	0	0	0
<i>Festuca pratensis</i>	40 (1)	0	99	90	0	0	0	3	0	0	0
<i>Festuca rubra</i>	9 (1)	0	0	99	0	99	0	0	0	0	0
<i>Grindelia squarrosa</i>	43 (2)1	40	33	20	0	0	5	0	0	0	0
<i>Hypericum perforatum</i>	40 (2)	35	5	0	0	0	1	0	0	0	0
<i>Kochia scoparia</i>	86 (1)	40	13	17	0	17	2	0	0	0	0

Lactuca serriola	70 (2)1	60 36 40 0 40	2 0 0 0 0
Lappula floribunda	10 (1)	20 0 0 0 0	0 0 0 0 0
Lepidium campestre	50 (1)	50 40 5 0 90	0 1 0 0 3
Linaria dalmatica	17 (2)1	0 20 20 0 0	0 0 0 0 0
Linaria vulgaris	30 (2)1	13 20 33 0 33	0 0 2 0 2
Lychnis alba	10 (1)	0 0 40 0 0	0 0 0 0 0
Madia glomerata	90 (3)2	50 63 43 20 27	2 4 1 0 0
Matricaria matricarioides	60 (1)	99 40 0 0 0	3 2 1 0 0
Medicago lupulina	99 (2)1	72 50 48 35 0	4 3 2 0 0
Medicago sativa	33 (1)	10 99 0 0 0	0 12 0 0 0
Melilotus alba	29 (3)2	20 20 20 0 0	1 0 3 0 0
Melilotus officinalis	99 (3)2	60 88 78 15 47	3 5 17 1 1
Phalaris arundinacea	11 (1)	0 0 40 0 0	0 0 0 0 0
Phleum pratense	99 (10)	96 88 88 65 65	10 7 6 0 2
Plantago lanceolata	40 (1)	50 25 20 0 0	3 1 0 0 0
Plantago major	99 (1)	96 50 3 0 0	15 3 0 0 0
Poa compressa	99 (4)2	83 80 53 0 12	6 5 2 0 0
Poa pratensis	99 (14)13	98 98 80 75 72	26 16 8 4 12
Polygonum achoreum	13 (3)1	99 20 0 0 0	29 0 0 0 0
Polygonum aviculare	99 (1)	60 47 66 23 70	4 2 1 0 1
Prunella vulgaris	70 (2)1	63 73 20 0 0	3 5 1 0 0
Rumex acetosella	99 (2)	80 90 62 0 4	7 9 3 0 0
Rumex crispus	20 (2)1	0 80 0 0 0	0 3 0 0 0
Salsola kali	43 (1)	0 99 0 0 20	0 0 0 0 0
Setaria viridis	17 (4)1	80 20 0 0 0	3 0 0 0 0
Silene cucubalus	50 (2)1	15 12 30 0 0	1 1 1 0 0
Sisymbrium altissimum	71 (1)	20 60 32 0 13	0 0 0 0 0
Sisymbrium loeselii	43 (1)	7 20 20 0 27	0 0 0 0 0
Spergularia rubra	10 (1)	20 0 0 0 0	0 0 0 0 0
Tanacetum vulgare	10 (1)	0 20 0 0 0	0 0 0 0 0
Taraxacum officinale	99 (12)9	99 94 84 76 40	12 8 5 2 0
Thlaspi arvense	17 (4)1	40 20 20 0 20	0 0 0 0 0
Tragopogon dubius	99 (3)2	40 51 24 27 49	0 0 0 0 0
Trifolium agrarium	40 (2)	40 55 35 10 0	0 1 1 0 0
Trifolium hybridum	99 (5)2	80 78 71 20 0	8 17 12 0 0
Trifolium pratense	90 (3)1	65 75 65 50 20	5 8 3 3 1
Trifolium procumbens	99 (2)1	73 77 43 0 10	6 5 2 0 0
Trifolium repens	99 (5)2	98 84 49 30 20	13 9 3 1 1
Triticum aestivum	57 (2)1	50 30 7 0 0	0 0 0 0 0
Verbascum thapsus	70 (1)	63 40 20 20 0	2 1 1 0 0
Veronica officinalis	30 (1)	80 33 0 0 0	0 2 0 0 0

Agrostis alba L.¹

Redtop occurs throughout the region (Booth 1950) and was found in all three parks.

The grass ranges upward from moist grasslands (FESC) through sagebrush (ARTR) to subalpine forests (ABLA) and meadows (FEID). The species was not found in either dry grasslands (BOGR and AGSP) or in the alpine.

Agrostis thrives at roadsides. It is absent from disturbed sites in grass, sagebrush, and douglas fir communities-- perhaps because runoff water available at roadsides is not available here. In moister forest sites it appears on most heavily disturbed (non-competitive) sites and many devegetated (more competitive) sites. In intact vegetation, *Agrostis* appears only rarely (in aspen) --probably because it cannot satisfy its water, light, or nutrient requirements in competition with other types of closed vegetation. [The plant also grows well along streams and irrigation ditches in the grassland zone.]

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in 1x5 m quadrat) and cover. The dominance of *Agrostis* on infected sites is low. At roadsides frequency was 5-99% and cover was 0-13%. In disturbed sites, frequency was 0-54% and cover was 0-4%. In near climax vegetation *Agrostis* frequency was 0-17% and cover was 0-2%

Table 3. Distribution of *Agrostis alba* L. by environmental type (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics																										
				shoulder						ditch sl						road cut						cleared						n-climax		
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv									
BOGR-STCO	0.	0.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.								
AGSP-BOGR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.								
FESC-FEID	40.	40.	10	75.	20.	0.	25.	5.	0.	.	.	.	.	.	.	.	.	.	.	.	.	.								
ARWY-FEID	60.	60.	10	67.	27.	0.	33.	10.	1.	.	.	.	.	.	.	.	.	.	.	.	.	.								
ARVA-FEID	30.	30.	10	99.	67.	5.	33.	20.	0.	.	.	.	.	.	.	.	.	.	.	.	.	.								
PSME-SYAL	0.	10.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.								
PSME-PHMA	33.	33.	6	50.	20.	0.	50.	10.	0.	.	.	.	.	.	.	.	.	.	.	.	.	.								
POTR	88.	88.	8	71.	46.	4.	99.	60.	11.	71.	43.	4.	.	.	.	.	.	.	29.	17.	2.	.								
THPL-OPHO	99.	99.	10	99.	80.	6.	99.	88.	5.	.	.	.	.	.	.	.	.	.	.	.	.	.								
TSHE-CLUN	70.	70.	10	86.	40.	1.	99.	77.	4.	86.	54.	2.	.	.	.	.	.	.	.	.	.	.								
ABLA-CLUN	78.	78.	9	86.	43.	1.	33.	20.	1.	57.	23.	0.	.	.	.	.	.	.	.	.	.	.								
ABLA-XETE	60.	60.	10	67.	23.	0.	33.	10.	0.	83.	27.	0.	20.	8.	0.	.	.	.	.	.	.	.								
ABLA-ARCO	40.	50.	10	25.	10.	0.	50.	10.	0.	50.	10.	0.	25.	5.	0.	.	.	.	.	.	.	.								
ABLA-VASC	60.	60.	10	99.	53.	7.	83.	57.	13.	67.	23.	0.	17.	7.	0.	.	.	.	.	.	.	.								
FEID-AGCA	40.	40.	10	25.	20.	1.	99.	30.	1.	.	.	.	.	.	.	.	.	.	.	.	.	.								
ALPINE	0.	0.	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.								

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Agropyron cristatum (L.) Gaertn.¹

Crested wheatgrass has been widely planted in BOGR-STCO, AGSP, and FEID habitats throughout the northern Rockies. We found it in the Grand Teton and Yellowstone areas, but not in Glacier.

The grass's altitudinal range is from dry grasslands (BOGR and AGSP) through sagebrush (ARTR) habitat types to *Pseudotsuga* (PSME) types. It did not appear in moist forest, cool forest, or alpine habitats.

The grass occupies roadsides throughout its altitudinal range. It also tends to invade heavily disturbed sites (roadcuts). While it may invade undisturbed dry grasslands (BOGR and AGSP), the more competitive vegetation of moister areas apparently excludes it.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency = probability of occurrence in 1x5 m quadrat) and cover. In roadside vegetation the frequency of *Agropyron cristatum* was 7-80% and its cover was 0-7%. On disturbed sites its frequency was 0-40% and cover was 0-2%. In near climax vegetation its frequency was 0-3% and its cover is 0-7%.

Table 4. Distribution of *Agropyron cristatum* (L.) Gaertn. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics															
				shoulder			ditch			sl			road cut			cleared			n-climax
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	
BOGR-STCO	99.99	7		86.51	2.		99.60	7.		71.34	2.						43.	3.	0.
AGSP-BOGR	63.75	8		80.64	4.		80.36	2.		.	.	.					20.	0.	0.
FESC-FEID	0.	0.10		.	.	.	.	.	.	.	.	.					.	.	.
ARWY-FEID	10.10	10		99.20	0.		.	.	.	.	.	.					.	.	.
ARVA-FEID	10.10	10		99.80	0.		99.20	0.		99.40	0.						.	.	.
PSME-SYAL	30.30	10		67.27	0.		33.	7.	0.	.	.	.	.	.	.		.	.	.
PSME-PHMA	33.33	6		99.50	0.		.	.	.	.	.	.	.	.	.		.	.	.
POTR	0.	0.8		.	.	.	.	.	.	.	.	.					.	.	.
THPL-OPHO	0.	0.10		.	.	.	.	.	.	.	.	.					.	.	.
TSHE-CLUN	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.		.	.	.
ABLA-CLUN	0.	0.9		.	.	.	.	.	.	.	.	.	.	.	.		.	.	.
ABLA-XETE	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.		.	.	.
ABLA-ARCO	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.		.	.	.
ABLA-VASC	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.		.	.	.
FEID-AGCA	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.		.	.	.
ALPINE	0.	0.11		.	.	.	.	.	.	.	.	.	.	.	.		.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Agropyron intermedium (Host.)Beauv.¹

Intermediate wheatgrass has been widely introduced to our area as a forage grass; it is never-the-less not common. We observed it in the Yellowstone, but not in the Glacier or Teton areas.

The grass was seen in dry grassland habitat types (BOGR and AGSP), but not in moister grassland, shrubland, forest, or alpine habitat types.

Agropyron appeared on roadsides in dry habitat types. It was not seen on roadcut or undisturbed sites. The invasion of disturbed or undisturbed types may be prevented by the absence of water supplements from road runoff. If so, one might expect the species to perform better at moister, higher-altitude sites.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in 1x5 m quadrat) and cover. In roadside vegetation of infected sites *Agropyron*'s frequency was 0-60% and its cover was 0%. The species was never observed on seral or climax sites comprising the bulk of wildlands.

Table 5. Distribution of *Agropyron intermedium* (Host.)Beauv. by environmental type (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
				shoulder			ditch sl			road cut			cleared			n-climax		
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	29.29.	7		50.30.	0.		99.60.	0.		.	.	.				.	.	.
AGSP-BOGR	25.25.	8		.	.	.	99.20.	0.		.	.	.				.	.	.
FESC-FEID	0.	0.10		.	.	.	.	.	.	.	.	.				.	.	.
ARWY-FEID	0.	0.10		.	.	.	.	.	.	.	.	.				.	.	.
ARVA-FEID	0.	0.10		.	.	.	.	.	.	.	.	.				.	.	.
PSME-SYAL	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-PHMA	0.17.	6		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POTR	0.	0. 8		.	.	.	.	.	.	.	.	.				.	.	.
THPL-OPHO	0.	0.10		.	.	.	.	.	.	.	.	.				.	.	.
TSHE-CLUN	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-CLUN	0.	0. 9		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0.	0.10		.	.	.	.	.	.	.	.	.				.	.	.
ALPINE	0.	0.11		.	.	.	.	.	.	.	.	.				.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Agropyron repens (L.)Beauv.¹

While quackgrass appears throughout the northern Rocky Mountains (Forcella and Harvey 1981), we failed to find it in Glacier National Park. Quackgrass is considered noxious in Alberta.

The grass ranges from low altitude grassland habitat types through mid-altitude *Pseudotsuga* sites to high *Abies* forests habitat types. It was, however, not seen in sagebrush vegetation (ARTR), nor in warm moist forest habitats of Glacier National Park (*Populus*, *Thuja*, *Tsuga*, or *Abies*) .

Agropyron appears at roadsides and rarely away from them. Its exclusion from sites approximating wildland conditions may be via lack of water in the grass-shrubland habitat types (ie roadside plants in these habitats survive on runoff water) and a poor capacity to compete for essential light, water, or nutrients in forest habitats. [*A. repens* requires more water than *A. spicatum* does.]

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in 1x5 m quadrat) and cover. In roadside vegetation *Agropyron repens* had a frequency of 0-80% and a cover of 0-6%. On disturbed sites its frequency was 0-20% and its cover was 0%. In undisturbed vegetation frequency and cover were 0%.

Table 6. Distribution of *Agropyron repens* (L.)Beauv. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
				shoulder			ditch sl			road cut			cleared			n-climax		
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	14.14.	7		99.40.	0.		99.80.	4.		.	.	.				.	.	.
AGSP-BOGR	38.38.	8		99.73.	6.		.	.	.		.	.	.			.	.	.
FESC-FEID	10.10.	10		.	.	.	.	.	.	99.20.	0.					.	.	.
ARWY-FEID	0. 0.	10		.	.	.	.	.	.	.	.	.				.	.	.
ARVA-FEID	0. 0.	10		.	.	.	.	.	.	.	.	.				.	.	.
PSME-SYAL	40.40.	10		99.50.	3.		25.15.	0.		.	.	.	.	.	.	.	.	.
PSME-PHMA	50.50.	6		67.53.	3.		67.40.	6.		.	.	.	.	.	.	.	.	.
POTR	0. 0.	8		.	.	.	.	.	.	.	.	.				.	.	.
THPL-OPHO	0. 0.	10		.	.	.	.	.	.	.	.	.				.	.	.
TSHE-CLUN	0. 0.	10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-CLUN	0. 0.	9		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	0. 0.	10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	20.20.	10		.	.	.	99.20.	1.		.	.	.	.	.	.	.	.	.
ABLA-VASC	30.30.	10		33.27.	2.		99.40.	5.		.	.	.	.	.	.	.	.	.
FEID-AGCA	0. 0.	10		.	.	.	.	.	.	.	.	.				.	.	.
ALPINE	0. 0.	11		.	.	.	.	.	.	.	.	.				.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Alopecurus pratensis L.¹

While meadow foxtail occurs throughout the region, we recorded it at only two sites in southcentral Montana, one site in Teton, and nowhere in Glacier.

The grass was absent from dry grassland habitat types. It appeared in moister grassland (*Artemisia-Festuca*) and adjacent *Pseudotsuga* forest habitat types. It was not observed in moister forests, mountain meadows, or the alpine

Alopecurus was observed on roadsides and heavily disturbed sites, but never in natural vegetation.

A species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in 1x5 m quadrat) and cover. In roadside vegetation *Alopecurus* had a frequency of 0-20% and cover of 0%. In disturbed sites its frequency was 0-10% and its cover was 0%. In near-climax sites both frequency and cover were 0%.

Table 7. Distribution of *Alopecurus pratensis* L. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
				shoulder			ditch sl			road cut			cleared			n-climax		
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	0.	0.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AGSP-BOGR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FESC-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARWY-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARVA-FEID	10.	10.	10	.	.	.	99.	20.	0.	.	.	.	.	.	.	.	.	.
PSME-SYAL	20.	20.	10	50.	10.	0.	.	.	.	50.	10.	0.	.	.	.	.	.	.
PSME-PHMA	0.	0.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POTR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
THPL-OPHO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
TSHE-CLUN	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-CLUN	0.	0.	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	0.	0.	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Alyssum alyssoides L.¹

Pale alyssum is widely scattered in western Montana and Wyoming (Forcella and Harvey 1981) and appears in all three study areas.

This mustard thrives in low dry grassland habitat types and ranges up through *Pseudotsuga* habitat types to the high *Abies* zone. It was not found in the sagebrush zone of Grand Teton National Park, the moist forests of Glacier, or in the alpine.

Alyssum appears at roadsides, in disturbed areas, and in near-climax vegetation of the grassland zone. In dry *Pseudotsuga* habitat types it appears in all zones except the forest, where it probably cannot compete for light, water, or nutrients. In *Abies* forests, we saw it at roadsides only. [In AGSP and BOGR habitats it is often replaced by *A. desertorum*.]

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in 1x5 m quadrat) and cover. In roadside vegetation *Alyssum* 's frequency was 0-66% and its cover was 0-1%. In seral vegetation its frequency was 0-60%, and cover was 0%. In climax vegetation frequency was 0-75% and cover was 0-3%.

Table 8. Distribution of *Alyssum alyssoides* L. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.	Zonal statistics											
		shoulder			ditch sl			road cut			cleared		
	pc sc n	cn fq cv	cn fq cv	cn fq cv	cn fq cv	cn fq cv	cn fq cv	cn fq cv	cn fq cv	cn fq cv	cn fq cv	cn fq cv	cn fq cv
BOGR-STCO	99.99. 7	71.66. 0.	71.54. 1.	86.49. 0.								86.46. 0.	
AGSP-BOGR	99.99. 8	50.25. 0.	88.40. 0.	99.43. 0.								88.75. 3.	
FESC-FEID	60.60.10	67.27. 0.	83.40. 0.	17. 7. 0.								17. 3. 0.	
ARWY-FEID	0. 0.10	.	.	.	.	.	.	.	.	.	.	.	.
ARVA-FEID	0. 0.10	.	.	.	.	.	.	.	.	.	.	.	.
PSME-SYAL	20.20.10	.	.	.	50.20. 0.	.	.	.	.	99.40. 0.	.	.	.
PSME-PHMA	17.17. 6	99.20. 0.	.	.	.	99.20. 0.	99.60. 0.	.	.	.	.	.	.
POTR	13.13. 8	99.20. 0.	.	.	.	.	.	.	.	.	.	.	.
THPL-OPHO	0. 0.10	.	.	.	.	.	.	.	.	.	.	.	.
TSHE-CLUN	0. 0.10	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-CLUN	0. 0. 9	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	0. 0.10	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	0. 0.10	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	20.20.10	50.10. 0.	50.10. 0.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0. 0.10	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	0. 0.11	.	.	.	.	.	.	.	.	.	.	.	.

1

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Arabis glabra (L.) Bernh.¹

Tower rockcress is widespread in the northern Rocky Mountains but less common on adjacent plains. We recorded it in Glacier and Teton but not in the Yellowstone area.

This crucifer was found in grass-shrubland habitat types at low altitudes and in equal numbers in the *Abies* forest zone. The plant was apparently absent in dry grasslands (BOGR-AGSP), warm moist forests (*Thuja*-*Tsuga*) and the alpine.

In grassland shrubland sites *Arabis* occupies roadside, seral and climax vegetation. On conifer habitat types it appears in roadside and seral vegetation. The plant is absent from the forest understory, probably due to its inability to compete for light, nutrients, or water.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in 1x5 m quadrat) and cover. At roadsides *Arabis* has a frequency of 0-40% and cover of 0-1%. Under seral conditions its frequency was 0-60% and its cover was 0%. Under near climax conditions its frequency was 0-10% and its cover was 0%.

Table 9. Distribution of *Arabis glabra* (L.) Bernh. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics															
				shoulder			ditch sl			road cut			cleared			n-climax			
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	
BOGR-STCO	0.	0.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AGSP-BOGR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FESC-FEID	20.	20.	10	.	.	.	50.	10.	0.	.	.	.	.	.	.	50.	10.	0.	.
ARWY-FEID	90.	90.	10	44.	20.	0.	67.	40.	0.	11.	7.	0.	.	.	.	11.	2.	0.	.
ARVA-FEID	20.	20.	10	50.	20.	0.	50.	20.	0.	99.	50.	0.	.	.	.	.	.	.	.
PSME-SYAL	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-PHMA	0.	0.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POTR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
THPL-OPHO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
TSHE-CLUN	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-CLUN	11.	11.	9	.	.	.	.	.	.	99.	60.	0.	.	.	.	.	.	.	.
ABLA-XETE	20.	20.	10	.	.	.	.	.	.	99.	20.	0.	.	.	.	.	.	.	.
ABLA-ARCO	50.	50.	10	20.	4.	0.	80.	20.	0.	40.	20.	0.	20.	4.	0.	.	.	.	.
ABLA-VASC	20.	20.	10	99.	20.	0.	99.	30.	1.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	0.	0.	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Artemisia absinthium L.¹

Though common sagewort occurs in many northern Rocky Mountain counties (Booth and Wright 1959), we recorded it only in Glacier-- not in the Yellowstone or Teton areas. The plant is considered noxious in Washington and South Dakota.

This composite appeared in warm moist *Tsuga*-*Abies* habitat types. It did not appear in dry grassland, dry *Pseudotsuga* forest, the upper *Abies* forest or the alpine zones. If it requires moist habitat types (see below), the small size and large separation of such sites in the region may slow its spread.

Artemisia occurs on roadside and successional sites. [It can be abundant on disturbed sites in *Artemisia tridentata*-*Agropyron spicatum* and *Pinus ponderosa* habitat types not studied here.] It is excluded from climax forest sites-- probably by low availability of light, nutrients, and/or water.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in 1x5 m quadrat) and cover. At roadsides its frequency was 0-36 and its cover was 0%. On seral sites its frequency was 0-4% and cover was 0%. The species was absent from undisturbed sites.

Table 10. Distribution of *Artemisia absinthium* L. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
				shoulder			ditch sl			road cut			cleared			n-climax		
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	0.	0.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AGSP-BOGR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FESC-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARWY-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARVA-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-SYAL	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-PHMA	0.	0.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POTR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
THPL-OPHO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
TSHE-CLUN	50.	50.	10	60.	36.	0.	20.	4.	0.	20.	4.	0.	20.	4.	0.	.	.	.
ABLA-CLUN	11.	11.	9	99.	20.	0.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	0.	0.	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Berteroa incana (L.)DC.¹

Since 1890, hoary false-allysum has occupied scattered counties in NW Montana, most of SW Montana, and a block of NW Wyoming (Forcella and Harvey 1981). We found it in the Teton and Yellowstone areas, but not in Glacier.

In our samples the crucifer occurred occasionally in sagebrush and adjacent *Pseudotsuga* habitat types. It is known to occur in drier grasslands (BOGR-AGSP). We did not find it in the moist *Thuja-Tsuga* forest, *Abies* forest, or the alpine zones.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in 1x5 m quadrat) and cover. On roadsides *Berteroa*'s frequency was 0-40% and its cover was 0%. On seral sites its frequency was 0-40% and its cover was 0%. Frequency and cover were both zero in near climax vegetation.

Table 11. Distribution of *Berteroa incana* (L.)DC by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
				shoulder			ditch sl			road cut			cleared			n-climax		
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	0.	0.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AGSP-BOGR	0.13.	8		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FESC-FEID	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARWY-FEID	10.10.10			99.20.	0.		.	.	.	.	.	.	.	.	.	.	.	.
ARVA-FEID	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-SYAL	10.10.10			.	.	.	.	.	.	99.20.	0.		.	.	.	.	.	.
PSME-PHMA	17.17.6			99.40.	0.		.	.	.	.	.	.	99.40.	0.		.	.	.
POTR	0.	0.8		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
THPL-OPHO	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
TSHE-CLUN	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-CLUN	0.	0.9		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	0.	0.11		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Brassica kaber (DC)Wheeler¹

Charlock is a widespread weed of foothill wasteplaces (Booth and Wright 1966).

This mustard was a none-time occurrence in the Pseudotsuga zone.

The plant grew on a roadshoulder in no other disturbance zone.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in 1x5 m quadrat) and cover. On its roadshoulder site it occupied two of five quadrats (frequency = 40%) and provided no significant cover.

Table 12. Distribution of Brassica kaber (DC)Wheeler by habitat and disturbance type. Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
	pc	sc	n	shoulder			ditch sl			road cut			cleared			n-climax		
				cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	0.	0.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AGSP-BOGR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FESC-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARWY-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARVA-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-SYAL	10.	10.	10	99.	40.	0.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-PHMA	0.	0.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POTR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
THPL-OPHO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
TSHE-CLUN	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-CLUN	0.	0.	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	0.	0.	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Bromus inermis Leys.¹

Smooth brome is widely planted in pastures and roadsides of our area (Booth 1950) and may persist indefinitely.

This grass appeared at over a third of the sites in every habitat type sampled from dry grasslands to the alpine.

Bromus grows at roadsides at all altitudes. The grass appears on disturbed sites (roadcuts and cleared areas) in all zones, except the mountain meadow and alpine. We saw no invasion of undisturbed near-climax sites in the dry grassland (BOGR-AGSP) zone. Our data may underestimate the capacity of smooth brome to invade moister grass-and shrublands. The grass does appear under warm *Pseudotsuga* and *Thuja* forests. We did not see it in undisturbed vegetation of higher forests, mountain meadows, or the alpine.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in 1x5 m quadrat) and cover. At roadside sites *Bromus* had a frequency of 0-80% and a cover of 0-13%. On seral sites its frequency was 0-88% and its cover was 0-20%. In near climax sites frequency was 0-23% and cover was 0%.

Table 13. Distribution of *Bromus inermis* Leys. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
	pc	sc	n	shoulder			ditch sl			road cut			cleared			n-climax		
				cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	71.86.	7		80.76.	7.		99.60.	3.		40.12.	0.					.	.	.
AGSP-BOGR	99.99.	8		88.65.	6.		88.43.	9.		50.30.	5.					.	.	.
FESC-FEID	60.60.	10		.	.	.	99.27.	2.		83.30.	3.					.	.	.
ARWY-FEID	99.99.	10		99.50.	6.		80.32.	2.		20.8.	0.					.	.	.
ARVA-FEID	70.70.	10		99.40.	3.		14.9.	0.		.	.	.				.	.	.
PSME-SYAL	99.99.	10		99.88.	9.		99.78.	12.		50.32.	4.		25.10.	0.		30.2.	0.	
PSME-PHMA	99.99.	6		99.77.	12.		83.83.	10.		83.33.	1.		.	.	.	.	.	.
POTR	75.75.	8		.	.	.	50.13.	0.		33.10.	0.					67.23.	0.	
THPL-OPHO	50.50.	10		20.4.	0.		80.68.	6.								.	.	.
TSHE-CLUN	50.50.	10		80.32.	3.		99.64.	4.		99.88.	20.		60.52.	7.		.	.	.
ABLA-CLUN	99.99.	9		89.62.	2.		80.68.	4.		89.73.	6.		25.25.	4.		.	.	.
ABLA-XETE	90.90.	10		67.62.	8.		89.60.	3.		67.31.	0.		.	.	.	.	.	.
ABLA-ARCO	99.99.	10		99.80.	13.		80.56.	4.		70.54.	2.		30.20.	1.		.	.	.
ABLA-VASC	50.50.	10		99.64.	8.		80.60.	6.		80.56.	5.		60.16.	1.		.	.	.
FEID-AGCA	99.99.	10		80.50.	4.		80.36.	2.		.	.	.				.	.	.
ALPINE	36.45.	11		75.25.	0.		25.5.	0.		.	.	.				.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Bromus japonicus Thunb.¹

Since 1910, Japanese brome has spread throughout our area (Forcella and Harvey 1981). It is now found in all three study areas.

The grass is apparently confined to relatively low elevations. It was at a majority of dry grassland sites (BOGR-AGSP). [Apparently more drought tolerant than *B. tectorum*, it is especially abundant in grasslands and shrublands of the drier plains.] It appeared at up to 30% of the sites in some sagebrush, *Pseudotsuga*, and *Tsuga* habitat types. It did not appear in *Abies* forest, subalpine meadow, or alpine zones.

In grassland habitat types *Bromus* appeared at roadside, seral, and climax stands. The sparse data suggest a similar distribution in *Artemisia* and *Pseudotsuga* habitat types. This conclusion is reinforced by the data from ecologically similar *Bromus tectorum*.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in 1x5 m quadrat) and cover. At roadsides *Bromus japonicus* had a frequency of 0-99% and cover of 0%. At seral sites its frequency was 0-50% and cover was 0-1%. In climax vegetation frequency was 0-30% and cover was 0-1%.

Table 14. Distribution of *Bromus japonicus* Thunb. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
				shoulder			ditch sl			road cut			cleared			n-climax		
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	99.99	7		29.9	0.		29.9	0.		86.40	0.					29.9	0.	
AGSP-BOGR	50.63	8		50.10	0.		.	.	.	99.50	0.					50.30	1.	
FESC-FEID	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARWY-FEID	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARVA-FEID	10.10	10		99.20	0.		.	.	.	.	.	.	.	.	.	.	.	.
PSME-SYAL	20.20	10		.	.	.	50.20	0.		50.10	0.		.	.	.	.	.	.
PSME-PHMA	33.33	6		50.10	0.		.	.	.	.	.	.	.	.	.	50.10	0.	
POTR	0.	0.8		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
THPL-OPHO	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
TSHE-CLUN	10.10	10		.	.	.	.	.	.	99.20	1.		.	.	.	.	.	.
ABLA-CLUN	0.	0.9		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	0.	0.11		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Bromus tectorum L.¹

Since 1880, downy brome has occupied most of the northern Rocky Mountain region. It is found in all three parks. The species is especially important in AGSP and BOGR grasslands and is considered noxious in Alberta.

This grass is limited to relatively low elevations. It is most prevalent in dry grasslands (BOGR-AGSP), but also appears in *Artemisia* and *Pseudotsuga* habitat types.

Bromus occupies roadside, seral and climax vegetation in all these habitat types.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in 1x5 m quadrat) and cover. At roadsides *Bromus*' frequency was 0-83% and its cover was 0-17%. On seral sites frequency was 0-50% and cover was 10%. In climax vegetation its frequency was 0-35% and it covered 0-3% of the ground surface.

Table 15. Distribution of *Bromus tectorum* L. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
				shoulder			ditch sl			road cut			cleared			n-climax		
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	99.99.	7		86.83.	7.		71.69.	14.		99.60.	1.					57.26.	0.	
AGSP-BOGR	99.99.	8		63.53.	2.		88.73.	3.		75.60.	2.					75.35.	3.	
FESC-FEID	0.	0.10		.	.	.	.	.	.	.	.	.				.	.	.
ARWY-FEID	0.	0.10		.	.	.	.	.	.	.	.	.				.	.	.
ARVA-FEID	10.10.	10		99.99.	17.		99.80.	3.		.	.	.				.	.	.
PSME-SYAL	20.20.	10		50.20.	0.		99.70.	5.		.	.	.	.	.		50.10.	0.	
PSME-PHMA	33.33.	6		.	.	.	.	.	.	99.50.	1.		50.30.	0.		50.10.	0.	
POTR	0.	0.8		.	.	.	.	.	.	.	.	.				.	.	.
THPL-OPHO	0.	0.10		.	.	.	.	.	.	.	.	.				.	.	.
TSHE-CLUN	0.	0.10		.	.	.	.	.	.	.	.	.	.	.		.	.	.
ABLA-CLUN	11.11.	9		.	.	.	.	.	.	.	.	.	99.80.	1.		.	.	.
ABLA-XETE	0.	0.10		.	.	.	.	.	.	.	.	.	.	.		.	.	.
ABLA-ARCO	0.	0.10		.	.	.	.	.	.	.	.	.	.	.		.	.	.
ABLA-VASC	0.	0.10		.	.	.	.	.	.	.	.	.	.	.		.	.	.
FEID-AGCA	0.	0.10		.	.	.	.	.	.	.	.	.	.	.		.	.	.
ALPINE	0.	0.11		.	.	.	.	.	.	.	.	.	.	.		.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Camelina microcarpa (L.)Andr.¹

While littlepod false flax occurs throughout the region (Booth and Wright 1950), we only recorded it in the Yellowstone area. The species is considered noxious in Saskatchewan.

This mustard is found at low altitude, ie mostly in dry *Bouteloua gracilis* and *Agropyron spicatum* grasslands. It occasionally occurs in adjacent *Pseudotsuga* forests.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in 1x5 m quadrat) and cover. At the roadside its frequency was 0-24% and its cover was 0%. In seral sites its frequency was 0-35% and its cover was 0%. In near-climax vegetation its frequency was 0-8% and its cover was 0%.

Table 16. Distribution of *Camelina microcarpa* (L.)Andr by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
				shoulder			ditch sl			road cut			cleared			n-climax		
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	71.71.	7		40.	8.	0.	80.24.	0.		60.16.	0.					40.	8.	0.
AGSP-BOGR	50.50.	8		.	.	.	75.	5.	0.	99.35.	0.					25.	5.	0.
FESC-FEID	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARWY-FEID	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARVA-FEID	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-SYAL	10.10.	10		.	.	.	99.60.	0.		.	.	.	.	.	.	.	.	.
PSME-PHMA	0.	0.6		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POTR	0.	0.8		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
THPL-OPHO	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
TSHE-CLUN	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-CLUN	0.	0.9		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	0.	0.11		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Capsella bursa-pastoris (L)Medic.¹

Although shepard's purse is widely distributed in the northern Rocky Mountains (Booth and Wright 1959), we found none in Glacier and little in the Yellowstone and Teton areas. The species is considered noxious in Alberta.

The crucifers we found were in open forest habitat types between the dry *Pseudotsuga* forests and higher *Abies* forests. They were not found in dry grass and shrublands or in the alpine.

The species was found only on roadside sites-- never on disturbed or undisturbed sites.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in 1x5 m quadrat) and cover. On roadside sites *Capsella's* frequency was 0-20% and its cover was 0%. It did not occur away from roadsides.

Table 17. Distribution of *Capsella bursa-pastoris* (L)Medic by environment (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics															
				shoulder			ditch sl			road cut			cleared			n-climax			
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	
BOGR-STCO	0.	0.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AGSP-BOGR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FESC-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARWY-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARVA-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-SYAL	10.	10.	10	99.	20.	0.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-PHMA	0.	0.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POTR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
THPL-OPHO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
TSHE-CLUN	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-CLUN	0.	0.	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	10.	10.	10	.	.	.	99.	40.	0.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	30.	30.	10	67.	20.	0.	33.	7.	0.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	0.	0.	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Centaurea maculosa Lam.¹

Since 1900, spotted knapweed has occupied most of the northern Rocky Mountain region (Forcella and Harvey 1981). It is found in all three parks. The species is considered noxious throughout the northern Rocky Mountains.

The composite infects most habitat types from dry grasslands (BOGR and AGSP) through dry forests up to the lower *Abies* forests. Low temperatures may exclude it from higher *Abies* forests, mountain meadows, and the alpine.

Roadside sites are invaded in most sites infected with the species. Knapweed invades highly disturbed sites in grasslands and warm forests. It did not, however, invade highly disturbed sites in the subalpine fir (ABLA) zone. The species was only rarely observed in lightly disturbed sites. While undisturbed native grasslands were sometimes invaded, invasion of near-climax forests was never seen. [The species may be most invasive in *Agropyron spicatum* grasslands and Ponderosa pine zones not studied by us. A closely allied species, *C. diffusa*, also invades the AGSP zone.]

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in 1x5 m quadrat) and cover. At roadsides *Centaurea*'s frequency was 0-80% and its cover was 0-17%. On seral sites frequency was 0-60% and cover was 0-7%. On near-climax sites frequency was 0-20% and cover was 0%.

Table 18. Distribution of *Centaurea maculosa* Lam. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
				shoulder			ditch sl			road cut			cleared			n-climax		
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	57.99	7		75.30	1.		99.30	0.		75.20	1.					25.0	0.	0.
AGSP-BOGR	13.75	8		99.0	0.	0.	99.80	3.		99.60	0.					99.20	0.	0.
FESC-FEID	99.99	10		99.84	9.		90.60	17.		70.54	7.					10.4	0.	0.
ARWY-FEID	30.30	10		99.53	14.		67.40	9.		33.33	3.					.	.	.
ARVA-FEID	0.0	10		.	.	.	.	.	.	.	.	.				.	.	.
PSME-SYAL	10.20	10		99.40	0.		.	.	.	99.40	0.		.	.	.	.	.	.
PSME-PHMA	17.17	6		.	.	.	99.20	0.		.	.	.	.	.	.	.	.	.
POTR	88.88	8		57.46	6.		57.43	3.		86.37	1.					.	.	.
THPL-OPHO	20.20	10		99.30	1.		.	.	.	.	.	.				.	.	.
TSHE-CLUN	60.60	10		99.67	7.		83.50	4.		33.13	1.		17.3	0.		.	.	.
ABLA-CLUN	56.56	9		60.12	0.		50.10	0.		.	.	.	.	.	.	.	.	.
ABLA-XETE	30.40	10		99.27	0.		67.20	0.		.	.	.	.	.	.	.	.	.
ABLA-ARCO	0.0	10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	0.0	10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0.0	10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	0.0	11		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Cerastium vulgatum L.¹

Since 1880, big chickweed has occupied most of the northern Rocky Mountains (Forcella and Harvey 1981). We observed it in the Glacier and Yellowstone areas, but did not find it in Grand Teton National Park. The related *C. arvense* is considered noxious in Alberta.

This carnation was most common in *Festuca scabrella* grasslands, but also occurred in *Pseudotsuga*, *Thuja*, and *Abies* forest habitats.

Cerastium appeared in roadside sites in all habitat types studied. It invaded highly disturbed, but not lightly disturbed sites. It invaded grassland sites only in rough fescue habitats.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in 1x5 m quadrat) and cover. At roadsides *Cerastium* frequencies were 0-60% and its cover was 0-1%. In disturbed sites frequency was 0-70% and cover was 0-1%. In near climax sites frequency was 0-20% and cover was 9%.

Table 19. Distribution of *Cerastium vulgatum* L. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics															
				shoulder			ditch sl			road cut			cleared			n-climax			
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	
BOGR-STCO	0.	0.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AGSP-BOGR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FESC-FEID	70.	70.	10	29.	6.	0.	29.	6.	0.	57.	23.	0.	.	.	.	57.	20.	0.	
ARWY-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARVA-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-SYAL	10.	10.	10	99.	20.	0.	.	.	.	99.	20.	0.	.	.	.	.	.	.	.
PSME-PHMA	0.	0.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POTR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
THPL-OPHO	40.	40.	10	99.	60.	0.	50.	15.	0.	.	.	.	.	.	.	.	.	.	.
TSHE-CLUN	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-CLUN	0.	0.	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	20.	20.	10	50.	30.	1.	50.	30.	1.	99.	70.	1.	.	.	.	.	.	.	.
ABLA-ARCO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	0.	0.	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Chenopodium album L.¹

Lamb's quarter is found throughout the region (Booth and Wright 1959) and occurs in all three parks.

This goosefoot ranges from dry grassland habitat types through *Pseudotsuga* forests to subalpine forests and meadows. It was most prevalent in sagebrush habitat types of Teton. We did not find it in moist forest or alpine zones. *Chenopodium* was usually present at roadsides and highly disturbed roadcuts. [Similarly, it is often associated with crops.] It was less prevalent on vegetated sites. In native vegetation it only appeared in the *Artemisia*-*Festuca* habitat types.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in 1x5 m quadrat) and cover. At roadsides *Chenopodium* had a frequency of 0-40% and a cover of 0%. On seral sites its frequency was 0-40% and its cover was 0-1%. In undisturbed native vegetation its frequency was 0-8% and its cover was 0%.

Table 20. Distribution of *Chenopodium album* L. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
				shoulder			ditch sl			road cut			cleared			n-climax		
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	14.29.	7		.	.	.	.	.	.	99.40.	0.					.	.	.
AGSP-BOGR	25.25.	8		50.10.	0.		.	.	.	50.10.	0.					.	.	.
FESC-FEID	0. 0.10			.	.	.	.	.	.	.	.	.				.	.	.
ARWY-FEID	60.60.10			.	.	.	83.33.	0.		67.27.	1.					17. 3. 0.		
ARVA-FEID	80.80.10			38.20.	0.		50.23.	0.		50.15.	1.					38. 8. 0.		
PSME-SYAL	30.40.10			33.27.	0.		67.27.	0.		.	.	.	50.10.	0.		.	.	.
PSME-PHMA	0. 0. 6			.	.	.	.	.	.	.	.	.	.	.		.	.	.
POTR	0. 0. 8			.	.	.	.	.	.	.	.	.				.	.	.
THPL-OPHO	0. 0.10			.	.	.	.	.	.							.	.	.
TSHE-CLUN	0. 0.10			.	.	.	.	.	.	.	.	.	.	.		.	.	.
ABLA-CLUN	0. 0. 9			.	.	.	.	.	.	.	.	.	.	.		.	.	.
ABLA-XETE	0. 0.10			.	.	.	.	.	.	.	.	.	.	.		.	.	.
ABLA-ARCO	10.10.10			.	.	.	.	.	.	99.20.	0.		.	.		.	.	.
ABLA-VASC	20.20.10			50.10.	0.		50.10.	0.		.	.	.	.	.		.	.	.
FEID-AGCA	10.10.10			99.40.	0.		.	.	.	.	.	.				.	.	.
ALPINE	0. 0.11			.	.	.	.	.	.	.	.	.				.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Chrysanthemum leucanthemum L.¹

Oxeye daisy is widespread in western Montana (Booth and Wright 1959). While we recorded it in Glacier only, it has a strong potential to spread into moist sites in the other parks. The species is considered noxious in Washington and Wyoming.

We recorded this composite in moist forest (Thuja-Tsuga-Abies) habitat types. We see it spreading in other moist forest-grassland habitats. It did not occur in dry grassland-shrubland types, dry forests, in high Abies habitat types or in the alpine.

In the sites where *Chrysanthemum* was observed it occupied roadsides strongly. It was recorded on five disturbed sites. While we didn't record it on any lightly disturbed or climax sites, observations elsewhere suggest that it can-- at the least-- spread strongly in meadows appearing in the moist forest zone.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in 1x5 m quadrat) and cover. At roadsides *Chrysanthemum* had frequencies of 50-89% and cover of 1-7%. In disturbed sites it had frequencies of 0-36% and cover of 0-1%. We did not observe the species in undisturbed native vegetation.

Table 21. Distribution of *Chrysanthemum leucanthemum* L. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics															
				shoulder			ditch sl			road cut			cleared			n-climax			
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	
BOGR-STCO	0.	0.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AGSP-BOGR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FESC-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARWY-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARVA-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-SYAL	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-PHMA	0.	0.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POTR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
THPL-OPHO	70.	70.	10	99.	77.	3.	99.	89.	7.	.	.	.	.	.	.	.	.	.	.
TSHE-CLUN	99.	99.	10	90.	58.	2.	90.	60.	6.	50.	36.	1.	.	.	.	.	.	.	.
ABLA-CLUN	22.	22.	9	99.	60.	1.	99.	50.	3.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	0.	0.	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Cirsium arvense (L.) Scop.¹

Since 1880, Canadian thistle has spread widely in the northern Rocky Mountains. We saw it in all three parks. The species is considered noxious throughout the northern Rocky Mountains.

While this composite is most prevalent in warm forest habitat types it spreads downward into foothills grasslands and upward to *Abies* habitat types.

Despite its rhizomatous reproduction, *Cirsium* seems to prefer ditchslope to road shoulder sites. The species invades disturbed sites (roadcuts and cleared areas) at least as well as roadside sites. Thistle was found in little-disturbed native fescue and aspen vegetation and may be able to invade other moist grasslands and open forests.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in 1x5 m quadrat) and cover. At roadsides *Cirsium* frequency was 0-68% and cover was 0-20%, In disturbed areas *Cirsium* frequency was 0-66% and its cover was 0-2%. In near-climax vegetation its frequency was 0-33% and its cover was 0%.

Table 22. Distribution of *Cirsium arvense* (L.) Scop. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics															
				shoulder			ditch sl			road cut			cleared			n-climax			
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	
BOGR-STCO	0.	0.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AGSP-BOGR	13.25.	8		.	.	.	.	.	.	99.20.	0.		.	.	.	.	.	.	.
FESC-FEID	30.30.	10		.	.	.	33.	7.	0.	99.60.	2.					99.33.	0.		
ARWY-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARVA-FEID	10.10.	10		.	.	.	99.20.	0.		.	.	.	.	.	.	.	.	.	.
PSME-SYAL	70.80.	10		29.14.	1.		71.31.	1.		57.23.	0.		33.	7.	0.	.	.	.	.
PSME-PHMA	33.50.	6		50.10.	0.		.	.	.	50.20.	0.		99.20.	0.		.	.	.	.
POTR	88.88.	8		.	.	.	29.11.	0.		99.66.	2.					29.	6.	0.	
THPL-OPHO	50.50.	10		.	.	.	99.68.	2.		.	.	.	99.20.	0.		.	.	.	.
TSHE-CLUN	10.10.	10		.	.	.	.	.	.	.	.	.	99.20.	0.		.	.	.	.
ABLA-CLUN	11.11.	9		99.20.	0.		.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	10.10.	10		99.20.	1.		.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	10.10.	10		.	.	.	.	.	.	99.40.	0.		.	.	.	.	.	.	.
ABLA-VASC	10.10.	10		.	.	.	99.40.	0.		.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	0.	0.	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Cirsium vulgare (Savi.) Tenore ¹

Since 1880 bull thistle has spread to all but the driest parts of the northern Rocky Mountains (Forcella and Harvey 1981). We found it in Teton and Glacier, but not in Yellowstone. The species is considered noxious in Washington.

This composite seems to require moister conditions than *Cirsium arvense*, since its distribution is centered in Thuja-Tsuga-Abies forests. [Though we did not sample there, one sees sparse populations along dirt roads in the Idaho fescue zone.] We did record its presence in the upper Abies zone.

Our sample suggests that *Cirsium* requires disturbance for establishment. It was most prevalent on ditch slope, next most prevalent on road shoulders and road cuts. We saw no invasion of lightly disturbed or undisturbed native vegetation.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency = probability of occurrence in 1x 25m quadrat) and cover. At roadside *Cirsium* had a frequency of 0-34% and a cover of 0%. On disturbed sites frequency was 0-20 and cover was 0%. The species was not recorded on undisturbed sites.

Table 23. Distribution of *Cirsium vulgare* (Savi.) Tenore by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
				shoulder			ditch sl			road cut			cleared			n-climax		
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	0.	0.	7															
AGSP-BOGR	0.	0.	8															
FESC-FEID	0.	0.	10															
ARWY-FEID	0.	0.	10															
ARVA-FEID	0.	0.	10															
PSME-SYAL	0.	10.	10															
PSME-PHMA	0.	0.	6															
POTR	0.	0.	8															
THPL-OPHO	20.	20.	10	50.	20.	0.	50.	10.	0.									
TSHE-CLUN	70.	70.	10	14.	3.	0.	99.	34.	0.	29.	9.	0.						
ABLA-CLUN	33.	33.	9				67.	20.	0.	67.	20.	0.						
ABLA-XETE	0.	0.	10															
ABLA-ARCO	0.	0.	10															
ABLA-VASC	10.	10.	10				99.	20.	0.									
FEID-AGCA	0.	0.	10															
ALPINE	0.	0.	11															

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Convolvulus arvensis L.¹

Since 1880, field bindweed has occupied most of the northern Rocky Mountain region (Forcella and Harvey 1981). We found it occasionally in the Teton and Yellowstone areas and never in Glacier. The species is considered noxious in the northern Rocky Mountains.

This morning glory appeared in relatively warm-moist places at the lower forest boundary, ie in *Artemisia-Pseudotsuga* habitat types.

On our sites *Convolvulus* appeared only at roadsides. [It is a common weed of crops and cities in the AGSP and FEID zones.]

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. Its frequency at roadsides was 0-60% and it covered 0-12% of the ground area. Frequency and cover were 0% on undisturbed and disturbed land surfaces.

Table 24. Distribution of *Convolvulus arvensis* L. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
				shoulder			ditch sl			road cut			cleared			n-climax		
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	0.	0.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AGSP-BOGR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FESC-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARWY-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARVA-FEID	10.	10.	10	.	.	.	99.	60.	12.	.	.	.	.	.	.	.	.	.
PSME-SYAL	10.	10.	10	99.	20.	0.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-PHMA	0.	0.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POTR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
THPL-OPHO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
TSHE-CLUN	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-CLUN	0.	0.	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	0.	0.	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Cynoglossum officinale L.¹

Since 1880, houndstongue has occupied most of the northern Rocky Mountain region. While we recorded it only in the Yellowstone region, it can be expected to appear in the other parks. The species is considered noxious in Washington, British Columbia, and Wyoming.

This borage appeared in sample plots in *Pseudotsuga* habitat types. It was not sampled in dry grassland sagebrush, moist forest, or cool forest, high meadows, or alpine zones. However, its presence outside a sample plot in an *Agropyron* habitat indicates that it can occupy some warm dry sites below the *Pseudotsuga* zone, at least.

While *Cynoglossum* appeared mostly at roadsides, it was found on roadcuts twice. [It is also common around gates, corrals, and other sites associated with cattle use in the AGSP and, especially, FEID zones.]

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. At roadsides the frequency of *Cynoglossum* was 0-20% and its cover was 0-1%. In disturbed sites its frequency was 0-15% and its cover was 0%. We did not find *Cynoglossum* in undisturbed vegetation.

Table 25. Distribution of *Cynoglossum officinale* L. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics															
				shoulder			ditch sl			road cut			cleared			n-climax			
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	
BOGR-STCO	0.	0.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AGSP-BOGR	0.13.		8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FESC-FEID	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARWY-FEID	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARVA-FEID	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-SYAL	40.40.		10	75.15.	0.		50.5.	0.		50.15.	0.		.	.	.	.	.	.	.
PSME-PHMA	17.50.		6	.	.	.	99.20.	1.		.	.	.	.	.	.	.	.	.	.
POTR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
THPL-OPHO	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
TSHE-CLUN	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-CLUN	0.	0.	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	0.	0.11		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Dactylis glomerata L.¹

Orchardgrass has been widely introduced to pastures and roadsides, especially in the FEID and moister zones. It therefore appears in all three parks.

The grass is successful in sagebrush and forest habitat types. While it appeared once on a ditch slope in a *Bouteloua* habitat type it is usually absent from dry grassland habitat types. It is also rare or absent from the mountain meadow and alpine zone.

Dactylis is strongly present in roadside sites. It invades (or is seeded into) moist roadcut sites. It failed to invade lightly disturbed sites except in open *Pseudotsuga*-*Symphoricarpos* and *Abies*-*Vaccinium* habitat types. It appeared in undisturbed vegetation only at one *Pseudotsuga* site. On dry sites it is often replaced by *D. sophia* (L) Webb.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. At roadsides *Dactylis* frequency was 0-80% and its cover was 0-9%. On disturbed sites frequency was 0-70% and its cover was 0-5. In undisturbed sites its frequency was 0-10% and its cover was 0%.

Table 26. Distribution of *Dactylis glomerata* L. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
				shoulder			ditch sl			road cut			cleared			n-climax		
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	14.14.	7		.	.	.	99.20.	0.		.	.	.				.	.	.
AGSP-BOGR	0. 0.	8		.	.	.	.	.	.	.	.	.				.	.	.
FESC-FEID	0. 0.	10		.	.	.	.	.	.	.	.	.				.	.	.
ARWY-FEID	60.60.	10		99.40.	3.		67.20.	2.		33.17.	1.					.	.	.
ARVA-FEID	60.60.	10		50.27.	1.		67.30.	1.		50.17.	0.					.	.	.
PSME-SYAL	60.80.	10		33.10.	0.		50.13.	0.		17. 7.	0.		99.40.	0.		17.10.	0.	
PSME-PHMA	67.67.	6		75.20.	1.		99.80.	9.		75.70.	5.		.	.	.	25. 5.	0.	
POTR	13.13.	8		99.20.	0.		99.20.	0.		.	.	.				.	.	.
THPL-OPHO	99.99.	10		99.60.	4.		30.16.	2.								.	.	.
TSHE-CLUN	50.50.	10		80.24.	0.		40.16.	0.		20. 0.	0.		.	.	.	.	.	.
ABLA-CLUN	44.44.	9		99.50.	1.		33. 0.	0.		.	.	.	.	.	.	.	.	.
ABLA-XETE	40.40.	10		75.25.	0.		50.20.	0.		25. 5.	0.		.	.	.	.	.	.
ABLA-ARCO	30.30.	10		99.40.	1.		33.20.	1.		33. 7.	0.		.	.	.	.	.	.
ABLA-VASC	50.50.	10		80.52.	4.		99.48.	4.		40.28.	0.		20. 4.	0.		.	.	.
FEID-AGCA	0. 0.	10		.	.	.	.	.	.	.	.	.				.	.	.
ALPINE	0. 0.	11		.	.	.	.	.	.	.	.	.				.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Descurainia pinnata (Walt.)Britt.¹

Pinnate tansey-mustard is widespread in our region (Booth and Wright 1959) and appeared in all three parks. The species is considered noxious in Alberta.

This mustard has a wide altitudinal range with good representation in both dry *Bouteloua-Agropyron* and moist *Agropyron caninum* grasslands. [It is sometimes replaced by *D. sophia* (L) Webb. on especially dry sites.] It is apparently absent in sagebrush and the alpine and poorly represented in the forest zone.

In grassland habitat types *Descurainia* appears at the roadside, on strongly disturbed roadcuts and (usually) in undisturbed grasslands. Appearances in the forest zone are only at the roadside.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. At roadsides *Descurainia* frequencies were 4-20% and cover was 0-1%. On disturbed sites frequencies were 28-37% and cover was 0-1%. In near-climax vegetation its frequency was 28-37% and cover was 0-1%.

Table 27. Distribution of *Descurainia pinnata* (Walt.)Britt by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
				shoulder			ditch sl			road cut			cleared			n-climax		
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	99.99.	7		43.17.	0.		29. 6.	0.		57.14.	0.					57.37.	0.	
AGSP-BOGR	63.63.	8		20. 4.	0.		60.20.	0.		80.32.	0.					80.36.	0.	
FESC-FEID	0. 0.10			.	.	.	.	.	.	.	.	.				.	.	.
ARWY-FEID	0. 0.10			.	.	.	.	.	.	.	.	.				.	.	.
ARVA-FEID	0. 0.10			.	.	.	.	.	.	.	.	.				.	.	.
PSME-SYAL	10.10.10			99. 0.	0.		99.40.	0.		.	.	.	.	.	.	.	.	.
PSME-PHMA	0. 0. 6			.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POTR	0. 0. 8			.	.	.	.	.	.	.	.	.				.	.	.
THPL-OPHO	0. 0.10			.	.	.	.	.	.	.	.	.				.	.	.
TSHE-CLUN	0. 0.10			.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-CLUN	11.11. 9			.	.	.	99.40.	1.		.	.	.	.	.	.	.	.	.
ABLA-XETE	0. 0.10			.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	0. 0.10			.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	0. 0.10			.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	50.50.10			20.12.	0.		40.20.	1.		40.32.	1.					80.28.	1.	
ALPINE	0. 0.11			.	.	.	.	.	.	.	.	.				.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Festuca arundinacea Schreb.¹

Tall fescue is planted widely in pastures (Hitchcock and Cronquist 1973) of relatively warm moist areas. We found it in the Yellowstone area, but in neither the Glacier nor Teton areas. It occasionally occurred at roadsides as if it were unsuccessfully planted there.

This grass may be limited to lower altitudes. In our samples it appeared once in the *Bouteloua* zone and twice in the *Pseudotsuga* zone.

Festuca appeared twice on the roadside ditch slope and once on a roadcut.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. At the roadside, *festuca* had a frequency of 99% and cover of 3-13%. On seral sites its frequency was 20% and its cover was 0%. It was absent from native vegetation.

Table 28. Distribution of *Festuca arundinacea* Schreb. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
				shoulder			ditch sl			road cut			cleared			n-climax		
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	14.29	7		.	.	.	99.99	3.		.	.	.				.	.	.
AGSP-BOGR	0.0	8		.	.	.	.	.	.	.	.	.				.	.	.
FESC-FEID	0.0	10		.	.	.	.	.	.	.	.	.				.	.	.
ARWY-FEID	0.0	10		.	.	.	.	.	.	.	.	.				.	.	.
ARVA-FEID	0.0	10		.	.	.	.	.	.	.	.	.				.	.	.
PSME-SYAL	20.30	10		.	.	.	99.90	13.		50.20	0.		.	.	.	.	.	.
PSME-PHMA	0.0	6		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POTR	0.0	8		.	.	.	.	.	.	.	.	.				.	.	.
THPL-OPHO	0.0	10		.	.	.	.	.	.	.	.	.				.	.	.
TSHE-CLUN	0.0	10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-CLUN	0.0	9		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	0.0	10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	0.0	10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	0.0	10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0.0	10		.	.	.	.	.	.	.	.	.				.	.	.
ALPINE	0.0	11		.	.	.	.	.	.	.	.	.				.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Festuca pratensis Huds.¹

Meadow fescue is very similar to *F. Arundinacea*. It is widely planted as a pasture grass (Hitchcock and Cronquist 1973). We found it in the Teton and Yellowstone areas, but not in Glacier.

This grass ranged from the lower forest boundary to the alpine. It was absent from the dry grassland, sagebrush, and wet forest zones.

Festuca was present at roadsides, in the *Pseudotsuga*, *Abies*, and alpine zones. It only reached the roadcut in *Pseudotsuga* stands. And it never established in undisturbed vegetation.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. At roadsides *Festuca*'s frequency was 7-40% and its cover was 0-3%. In seral sites frequency was 20-40% and cover was 0%. Cover and frequency were 0% in undisturbed vegetation.

Table 29. Distribution of *Festuca pratensis* Huds. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
				shoulder			ditch sl			road cut			cleared			n-climax		
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	0.	0.	7															
AGSP-BOGR	0.	0.	8															
FESC-FEID	0.	0.	10															
ARWY-FEID	0.	0.	10															
ARVA-FEID	0.	0.	10															
PSME-SYAL	40.	50.	10	50.	10.	0.	75.	35.	3.	25.	20.	0.						
PSME-PHMA	33.	50.	6							99.	40.	0.						
POTR	0.	0.	8															
THPL-OPHO	0.	0.	10															
TSHE-CLUN	0.	0.	10															
ABLA-CLUN	0.	0.	9															
ABLA-XETE	0.	0.	10															
ABLA-ARCO	30.	30.	10	67.	20.	0.	33.	7.	0.									
ABLA-VASC	30.	30.	10	33.	13.	0.	67.	33.	2.									
FEID-AGCA	10.	10.	10				99.	40.	0.									
ALPINE	9.	9.	11	99.	20.	0.												

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Festuca rubra L.¹

Red fescue is widespread in North America (Hitchcock and Cronquist 1973). While we found it only on the Beartooth plateau, it might be expected in all three parks.

From our samples this grass appears to be restricted to high altitude; its North American distribution belies this conclusion.

At our single infected site red fescue appeared in both disturbed and undisturbed turf.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. *Festuca* did not appear on roadside sites. It appeared outside the plot on one roadcut. In undisturbed vegetation its frequency was 40% and its cover was 0%.

Table 30. Distribution of *Festuca rubra* L. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics															
				shoulder			ditch sl			road cut			cleared			n-climax			
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	
BOGR-STCO	0.	0.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AGSP-BOGR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FESC-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARWY-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARVA-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-SYAL	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-PHMA	0.	0.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POTR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
THPL-OPHO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
TSHE-CLUN	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-CLUN	0.	0.	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	9.	9.	11	.	.	.	.	.	.	99.	0.	0.	.	.	.	99.	40.	0.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Grindelia squarrosa (Pursh.)Dunal¹

Although curlcup gumweed is widespread in our region (Booth and Wright 1959), we found it in Teton and Yellowstone but not in Glacier.

This sticky composite is apparently restricted to low dry areas. We found it in *Bouteloua* and *Agropyron* habitat types. We did not find it in moist grasslands, forests, or the alpine.

The species was found primarily at roadsides. It extended to highly disturbed sites (roadcuts) in dry grasslands.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. at roadsides *Grindelia*'s frequency was 7-40% and its cover was 0-5%. On disturbed sites frequencies were 0-40% and cover was 0%. No *Grindelia* plants occurred on near-climax sites.

Table 31. Distribution of *Grindelia squarrosa* (Pursh)Dunal by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
				shoulder			ditch sl			road cut			cleared			n-climax		
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	43.43.	7		67.13.	0.		99.33.	0.		67.20.	0.					.	.	.
AGSP-BOGR	38.63.	8		67.40.	2.		67. 7.	0.		67.13.	0.					.	.	.
FESC-FEID	0. 0.10			.	.	.				.	.	.				.	.	.
ARWY-FEID	0. 0.10			.	.	.				.	.	.				.	.	.
ARVA-FEID	10.10.10			99.40.	5.		.	.	.	.	.	.				.	.	.
PSME-SYAL	0. 0.10			.	.	.				.	.	.				.	.	.
PSME-PHMA	0. 0. 6			.	.	.				.	.	.				.	.	.
POTR	0. 0. 8			.	.	.				.	.	.				.	.	.
THPL-OPHO	0. 0.10			.	.	.				.	.	.				.	.	.
TSHE-CLUN	0. 0.10			.	.	.				.	.	.				.	.	.
ABLA-CLUN	0. 0. 9			.	.	.				.	.	.				.	.	.
ABLA-XETE	0. 0.10			.	.	.				.	.	.				.	.	.
ABLA-ARCO	0. 0.10			.	.	.				.	.	.				.	.	.
ABLA-VASC	0. 0.10			.	.	.				.	.	.				.	.	.
FEID-AGCA	0. 0.10			.	.	.				.	.	.				.	.	.
ALPINE	0. 0.11			.	.	.				.	.	.				.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Hypericum perforatum L.¹

St John's wort or Klamath weed has spread over most of NW Montana and entered the Yellowstone Teton area since the early 1900's (Forcella and Harvey 1981). It occurred in our samples in Glacier, and was seen in the Yellowstone and Teton areas. The plant is considered noxious in Montana, Oregon, and Washington.

While this hypericaceous herb fell in sample plots only in moist Tsuga forests of Glacier it is known to occur in sagebrush-fescue zone of Grand Teton National Park [and in fescue grasslands throughout the area.]

In Tsuga forests Hypericum appears at roadsides and in roadcuts.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. On roadsides hypericum's frequency was 5-35% and its cover was 0-1%. On disturbed sites (roadcuts) its frequency and cover were 0%. it was not found in near-climax vegetation.

Table 32. Distribution of Hypericum perforatum L. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics															
				shoulder			ditch sl			road cut			cleared			n-climax			
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	
BOGR-STCO	0.	0.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AGSP-BOGR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FESC-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARWY-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARVA-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-SYAL	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-PHMA	0.	0.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POTR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
THPL-OPHO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
TSHE-CLUN	40.	40.	10	99.	35.	1.	25.	5.	0.	25.	0.	0.	.	.	.	.	.	.	.
ABLA-CLUN	0.	0.	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	0.	0.	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Kochia scoparia (L.)Schrad.¹

Since 1940, *Kochia* has spread over most of Wyoming and Montana (Forcella and Harvey 1981), though not into Grand Teton National Park. The plant can be a serious weed of Montana grainfields and is considered noxious in Saskatchewan.

This chenopod is apparently restricted to low warm sites. In our samples it ranged from dry grassland habitat types(BOGR) up to low forests (Pseudotsuga).

The species occupies roadside sites throughout the area. In dry grasslands, at least, it appears in disturbed sites and near-climax vegetation.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. At roadsides *Kochia* frequency was 10-40% and its cover was 0-2%. On roadcuts its frequency was 0-17% and its cover was 0%. In near-climax vegetation its frequency was 0-17% and its cover was 0%.

Table 33. Distribution of *Kochia scoparia* (L.)Schrad. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
	pc	sc	n	shoulder			ditch sl			road cut			cleared			n-climax		
				cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	86.86	7		67.40	2.		33.13	0.		33.17	0.					33.17	0.	
AGSP-BOGR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FESC-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARWY-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARVA-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-SYAL	20.20	10		50.10	0.		50.10	0.		.	.	.	.	.	.	.	.	.
PSME-PHMA	0.	0.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POTR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
THPL-OPHO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
TSHE-CLUN	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-CLUN	0.	0.	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	0.	0.	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Lactuca serriola L.¹

While yellow prickly lettuce is widespread in the northern Rocky Mountains (Booth and Wright 1959), we found it only in the Teton and Yellowstone areas. This composite is largely restricted to low elevation sites: it occurs in dry grassland, sagebrush, and *Pseudotsuga* zones. While it is rare above the *Pseudotsuga* zone we did find it in one *Abies-Vaccinium* stand. [We also see *L. serriola* in irrigated pastures in the *Agropyron spicatum* zone.]

At infected sites roadsides and disturbed areas (roadcuts) are occupied. Near-climax vegetation was invaded only in grasslands.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. At roadsides *Lactuca* frequency was 0-60% and cover was 0-2%. On roadcuts frequency was 13-40% and cover was 0%. In near climax vegetation frequency was 0-40% and cover was 0%.

Table 34. Distribution of *Lactuca serriola* L. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.	Zonal statistics											
		shoulder			ditch sl			road cut			cleared		
	pc sc n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	71.99. 7	80.56.	2.		40.24.	0.		40.20.	0.			40. 4. 0.	
AGSP-BOGR	63.63. 8	20. 8.	0.		80.36.	0.		40.40.	0.			60.40. 0.	
FESC-FEID	0. 0.10	.	.	.	.	.	.	.	.	.	.	.	.
ARWY-FEID	30.30.10	67.13.	0.		99.27.	0.		.	.	.	.	.	.
ARVA-FEID	40.40.10	99.60.	2.		75.20.	0.		50.20.	0.		.	.	.
PSME-SYAL	30.30.10	99.27.	0.		33.20.	0.		33.13.	0.		.	.	.
PSME-PHMA	33.67. 6	50.50.	1.		.	.	.	99.30.	0.		.	.	.
POTR	0. 0. 8	.	.	.	.	.	.	.	.	.	.	.	.
THPL-OPHO	0. 0.10	.	.	.	.	.	.	.	.	.	.	.	.
TSHE-CLUN	0. 0.10	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-CLUN	0. 0. 9	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	0. 0.10	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	0. 0.10	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	10.10.10	.	.	.	99.20.	0.		.	.	.	.	.	.
FEID-AGCA	0. 0.10	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	0. 0.11	.	.	.	.	.	.	.	.	.	.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Lappula echinata Gilib.¹

Since 1900, european sticktight has occupied most of the northern Rocky Mountain region. (Forcella and Harvey 1980). The plant is considered noxious in Alberta and Saskatchewan.

This borage was a one-time occurrence in our Pseudotsuga zone.

The species occurred on a roadside at one site.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. On a roadside *Lappula*'s frequency was 20% and its cover was 0%. *Lappula* was not found in seral or climax vegetation.

Table 35. Distribution of *Lappula floribunda* (Lehm.)Johnst. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics															
				shoulder			ditch sl			road cut			cleared			n-climax			
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	
BOGR-STCO	0.	0.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AGSP-BOGR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FESC-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARWY-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARVA-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-SYAL	10.	10.	10	99.	20.	0.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-PHMA	0.	0.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POTR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
THPL-OPHO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
TSHE-CLUN	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-CLUN	0.	0.	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	0.	0.	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Lepidium campestre (L.)R.Br.¹

Since 1910 field pepperweed has occupied most of the foothill grassland-shrubland zone of the northern Rocky Mountains (Forcella and Harvey 1981). We found it in all three parks.

This mustard was found in low altitude dry sites including dry grassland (BOGR-AGSP), sagebrush, aspen, and *Pseudotsuga* zones.

While the mustard was generally present on the ditch slope, it was usually absent from the immediate roadside. In dry grasslands it occupied disturbed sites (roadcuts) and near-climax vegetation.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency = probability of occurrence in a 1x5 m quadrat) and cover. At roadsides its frequency was 0-50% and its cover was 0-1%. In disturbed areas its frequency was 0-5% and its cover was 0%. In climax vegetation frequency was 0-90% and its cover was 0-3%.

Table 36. Distribution of *Lepidium campestre* (L.)R.Br. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
				shoulder			ditch sl			road cut			cleared			n-climax		
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	29.	29.	7	.	.	.	.	.	.	50.	0.	0.				99.	90.	0.
AGSP-BOGR	50.	50.	8	.	.	.	25.	5.	0.	25.	5.	0.				50.	25.	0.
FESC-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.				.	.	.
ARWY-FEID	20.	20.	10	99.	50.	0.	50.	10.	1.	.	.	.				.	.	.
ARVA-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.				.	.	.
PSME-SYAL	10.	10.	10	.	.	.	99.	40.	0.	.	.	.	.	.	.	.	.	.
PSME-PHMA	0.	0.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POTR	13.	13.	8	.	.	.	.	.	.	.	.	.				99.	80.	3.
THPL-OPHO	0.	0.	10	.	.	.	.	.	.	.	.	.				.	.	.
TSHE-CLUN	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-CLUN	0.	0.	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	0.	0.	11	.	.	.	.	.	.	.	.	.				.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Linaria dalmatica (L.) Mill¹

Dalmatian toadflax has spread through most of the northern Rocky Mountain area since 1940 (Forcella and Harvey 1981). It occurred in our samples in the Glacier and Yellowstone areas, but not at Teton. The plant is considered noxious throughout the northern Rocky Mountains.

Our data show that this scroph grows best in *Pseudotsuga* and *Abies* habitat types. Due to our small sample size we may underestimate the invasive potential of this species; it probably grows in moist grasslands as well.

Linaria appeared on ditch slopes-- not on the road shoulder-- and on heavily disturbed sites (roadcuts). It was not found in undisturbed vegetation. [*Linaria* sometimes invades little disturbed AGSP grasslands and *Pinus ponderosa*-AGSP forests in areas not sampled.]

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. At roadsides *Linaria*'s frequency was 0-20% and its cover was 0%. On disturbed areas its frequency was 0-20% and its cover was 0%. No plants were observed in undisturbed vegetation.

Table 37. Distribution of *Linaria dalmatica* (L.) Mill by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics															
				shoulder			ditch sl			road cut			cleared			n-climax			
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	
BOGR-STCO	0.	0.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AGSP-BOGR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FESC-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARWY-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARVA-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-SYAL	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-PHMA	17.	17.	6	.	.	.	99.	20.	0.	.	.	.	.	.	.	.	.	.	.
POTR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
THPL-OPHO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
TSHE-CLUN	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-CLUN	11.	11.	9	.	.	.	.	.	.	99.	20.	0.	.	.	.	.	.	.	.
ABLA-XETE	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	0.	0.	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Linaria vulgaris Hill¹

Yellow toadflax has occupied most of the Northern Rocky Mountain area since 1900. We found it in all three study areas. The plant is considered noxious throughout the northern Rocky Mountains.

While this scroph does best in the fescue and Artemisia zones it does appear in moist Thuja-Tsuga forests. It does not appear in dry grasslands, Abies, or alpine sites. [In dry grasslands (AGSP) not sampled, *Linaria* is apparently associated with sites subject to spring flooding.]

Like *Linaria dalmatica*, *L.vulgaris* seems to avoid road-shoulder sites. *Linaria vulgaris* thrives on ditch slopes. It grows on disturbed sites (roadcuts), as well as in near-climax grasslands.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. At roadsides *Linaria* had a frequency of 0-20% and a cover of 0%. On disturbed sites it had a frequency of 20-33% and a cover of 1-2%. In near-climax vegetation it had a frequency of 0-33% and cover of 0-2%.

Table 38. Distribution of *Linaria vulgaris* Hill by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics															
				shoulder			ditch sl			road cut			cleared			n-climax			
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	
BOGR-STCO	0.	0.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AGSP-BOGR	0.13.		8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FESC-FEID	30.30.		10	.	.	.	33.	7.	0.	67.33.		2.				67.33.		2.	
ARWY-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARVA-FEID	30.30.		10	33.13.		0.	33.13.		0.	67.27.		1.				33.20.		0.	
PSME-SYAL	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-PHMA	0.	0.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POTR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
THPL-OPHO	10.10.		10	.	.	.	99.20.		0.							.	.	.	.
TSHE-CLUN	10.10.		10	.	.	.	.	.	.	99.20.		1.	.	.	.	.	.	.	.
ABLA-CLUN	0.	0.	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	0.	0.	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Lychnis alba L.¹

White cockle has spread over most of the northern Rocky Mountain area since it appeared there in 1900 (Forcella and Harvey 1980). Among our samples only those from the Teton area contain this exotic. The plant is considered noxious in Alberta and Saskatchewan.

In our samples this carnation caryophyll appeared once in an *Abies* habitat type. Since it is known to occur in fescue grasslands near Bozeman we assume it can occur in most altitudinal zones except the driest grassland habitats and the coolest mountain meadow and alpine sites.

We found *Lychnis* on a disturbed (roadcut) site, but since it often occupies roadside (ditch slope) sites in the Gallatin Valley we believe it can spread to sites getting most any kind of disturbance.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. The plant had a low dominance wherever it occurred. At our *Abies-Vaccinium* site it had a frequency of 40% and 0% cover.

Table 39. Distribution of *Lychnis alba* L. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
	pc	sc	n	shoulder			ditch sl			road cut			cleared			n-climax		
				cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	0.	0.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AGSP-BOGR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FESC-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARWY-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARVA-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-SYAL	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-PHMA	0.	0.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POTR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
THPL-OPHO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
TSHE-CLUN	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-CLUN	0.	0.	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	10.	10.	10	.	.	.	.	.	.	99.	40.	0.	.	.	.	.	.	.
FEID-AGCA	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	0.	0.	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Madia glomerata Hook.¹

Cluster tarweed is widely distributed in the northern Rocky Mountains (Booth and Wright 1959). We found it in all three study areas.

This composite ranges from moist grasslands through Thuja forests to mountain meadows. It does not grow in the lower grassland zone in the closed forest, or in the alpine zones.

Madia grows well at roadsides. While it grew on highly disturbed sites (roadsides) in moist occupied it rarely grew on less disturbed sites (non-competitive). It establishes in undisturbed grass-shrubland vegetation, ie in Teton's low artemisia and high festuca zones.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. At roadsides its frequency was 17-63% and its cover was 0-4. In disturbed areas *Madia*'s frequency was 0-43% and its cover was 0-1%. In near climax vegetation *Madia*'s frequency was 0-27% and its cover was 0%

Table 40. Distribution of *Madia glomerata* Hook by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics															
				shoulder			ditch sl			road cut			cleared			n-climax			
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	
BOGR-STCO	0.	0.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AGSP-BOGR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FESC-FEID	10.	10.	10	99.	20.	0.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARWY-FEID	90.	90.	10	56.	27.	1.	67.	38.	1.	78.	33.	0.	.	.	.	67.	27.	0.	
ARVA-FEID	90.	90.	10	67.	33.	1.	89.	47.	1.	56.	31.	1.	.	.	.	56.	27.	0.	
PSME-SYAL	40.	40.	10	99.	50.	2.	50.	25.	0.	25.	5.	0.	.	.	.	.	.	.	
PSME-PHMA	0.	0.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
POTR	88.	88.	8	43.	17.	0.	43.	29.	1.	43.	23.	0.	.	.	.	.	.	.	
THPL-OPHO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
TSHE-CLUN	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
ABLA-CLUN	0.	0.	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
ABLA-XETE	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	
ABLA-ARCO	50.	50.	10	.	.	.	99.	48.	1.	60.	28.	0.	.	.	.	.	.	.	
ABLA-VASC	60.	60.	10	67.	33.	1.	83.	63.	4.	83.	43.	1.	33.	20.	0.	.	.	.	
FEID-AGCA	50.	50.	10	40.	20.	0.	80.	56.	1.	40.	28.	0.	.	.	.	40.	12.	0.	
ALPINE	0.	0.	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Matricaria matricarioides (Less.)Porter¹

While pineapple weed appears in northern Rocky Mountains (Booth and Wright 1959), we found it only in the Teton and Yellowstone areas and not in Glacier. The plant is considered noxious in British Columbia and Saskatchewan.

This composite has a wide altitudinal range from *Artemisia-Festuca* shrublands through open forests to mountain meadows. We did not find it in dry grassland (BOGR-AGSP) habitat types, in dense *Thuja-Tsuga-Abies* forest habitat types, or in the alpine.

Matricaria was restricted mostly to wet road shoulders in the *Artemisia-Pseudotsuga* zone. At higher altitudes it spread to ditch sites. In still higher fescue-agropyron habitat type it invaded heavily disturbed (roadcut) sites.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. At roadsides, *Matricaria*'s frequency was 0-99% and its cover was 0-3%. In highly disturbed areas it's frequency was 0-20% and its cover was 0-1%. *Matricaria* was absent from lightly disturbed and near-climax sites.

Table 41. Distribution of *Matricaria matricarioides* (Less) Porter by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.	Zonal statistics														
		shoulder			ditch sl			road cut			cleared			n-climax		
	pc sc n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	0. 0. 7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AGSP-BOGR	0. 0. 8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FESC-FEID	0. 0.10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARWY-FEID	20.20.10	99.60.	3.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARVA-FEID	20.20.10	99.30.	1.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-SYAL	30.30.10	67.40.	0.	67.40.	0.	.	.	.	.	.	.	.	.	.	.	.
PSME-PHMA	17.17. 6	99.99.	3.	.	.	.	.	.	.	.	.	.	.	.	.	.
POTR	0. 0. 8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
THPL-OPHO	0. 0.10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
TSHE-CLUN	0. 0.10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-CLUN	0. 0. 9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	0. 0.10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	40.40.10	99.35.	1.	50.10.	0.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	60.60.10	83.53.	1.	67.30.	2.	.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	20.20.10	50.30.	1.	50.30.	1.	50.20.	1.	.	.	.	.	.	.	.	.	.
ALPINE	0. 0.11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Medicago lupulina L.¹

Since 1890, black medic has occupied most of the northern Rocky Mountains (Forcella and Harvey 1981). Although it is present in the Glacier area (Forcella and Harvey 1981), we did not find it in at our sites there.

This legume ranges from dry grassland habitat types to the mountain meadows. It is apparently absent from *Festuca scabrella* grasslands, wet *Populus-Thuja-Tsuga-Abies* forests and alpine sites.

It appears in roadside sites in all habitat types it occupies. It does not occupy disturbed sites in dry grassland habitat types-- perhaps it demands water running off the road for survival there. It does exist in disturbed sites in wetter areas indicating a good ability to invade strongly disturbed sites and some ability to compete in vegetated sites. *Medicago* was not found in undisturbed vegetation.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. In roadside vegetation its frequency was 8-72% and its cover was 0-4%. In disturbed sites its frequency was 0-35% and its cover was 0-2%. Medic did not appear in undisturbed vegetation.

Table 42. Distribution of *Medicago lupulina* L. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
	pc	sc	n	shoulder			ditch sl			road cut			cleared			n-climax		
				cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	14.14.	7		.	.	.	99.20.	0.		.	.	.				.	.	.
AGSP-BOGR	25.25.	8		50.10.	0.		50.40.	0.		.	.	.				.	.	.
FESC-FEID	0. 0.10			.	.	.	.	.	.	.	.	.				.	.	.
ARWY-FEID	99.99.10			99.72.	4.		70.44.	3.		10. 4.	0.					.	.	.
ARVA-FEID	90.90.10			67.36.	1.		67.20.	0.		.	.	.				.	.	.
PSME-SYAL	50.60.10			40. 8.	0.		60.36.	1.		60.40.	1.		.	.	.	.	.	.
PSME-PHMA	83.83. 6			40.36.	0.		40.24.	0.		80.48.	1.		75.35.	0.		.	.	.
POTR	0. 0. 8			.	.	.	.	.	.	.	.	.				.	.	.
THPL-OPHO	0. 0.10			.	.	.	.	.	.							.	.	.
TSHE-CLUN	0. 0.10			.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-CLUN	0. 0. 9			.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	0. 0.10			.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	40.40.10			50.15.	0.		50.25.	1.		75.35.	2.		.	.	.	.	.	.
ABLA-VASC	80.80.10			63.55.	3.		75.50.	2.		50.30.	2.		13. 5.	0.		.	.	.
FEID-AGCA	60.60.10			67.40.	2.		50.33.	2.		50.13.	0.					.	.	.
ALPINE	0. 0.11			.	.	.	.	.	.	.	.	.				.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Medicago sativa L.¹

As a crop alfalfa is widely planted in the Northern Rocky Mountains and it occasionally escapes. It was found in all three study areas.

This legume was found in dry grasslands (BOGR and AGSP), relatively dry forests (*Pseudotsuga* and *Populus*) and an open *Abies* forest. It was not found in sagebrush, wet forest, or alpine habitats.

While *Medicago* generally appeared on ditch slopes it was often absent from road shoulders. We did not observe it on disturbed sites, but its occasional presence on near-climax sites suggests that it can grow in less competitive disturbed areas. In our samples the plant appeared in a *Bouteloua* range and it has been incidentally observed in grassland sites in *Agropyron spicatum*-*Festuca idahoensis* grasslands.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. At roadsides alfalfa frequency was 0-99% and its cover was 0-12%. We did not observe alfalfa on disturbed sites, but in near-climax vegetation its frequency and cover were both zero.

Table 42. Distribution of *Medicago sativa* L. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.	Zonal statistics																	
		shoulder			ditch sl			road cut			cleared			n-climax					
		pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv			
BOGR-STCO	14.14. 7				.	.	.	99.40.	0.		.	.	.				99. 0. 0.		
AGSP-BOGR	0.25. 8				.	.	.	.	.	.	.	.	.				.	.	.
FESC-FEID	0. 0.10				.	.	.	.	.	.	.	.	.				.	.	.
ARWY-FEID	0. 0.10				.	.	.	.	.	.	.	.	.				.	.	.
ARVA-FEID	0. 0.10				.	.	.	.	.	.	.	.	.				.	.	.
PSME-SYAL	0. 0.10				.	.	.	.	.	.	.	.	.				.	.	.
PSME-PHMA	33.33. 6				50.10.	0.		50.10.	0.		.	.	.	.	.	.	.	.	.
POTR	13.13. 8				.	.	.	99.60.	3.		.	.	.				.	.	.
THPL-OPHO	0. 0.10				.	.	.	.	.	.	.	.	.				.	.	.
TSHE-CLUN	0. 0.10				.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-CLUN	0. 0. 9				.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	0. 0.10				.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	0. 0.10				.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	10.10.10				.	.	.	99.99.12.			.	.	.	.	.	.	.	.	.
FEID-AGCA	0. 0.10				.	.	.	.	.	.	.	.	.				.	.	.
ALPINE	0. 0.11				.	.	.	.	.	.	.	.	.				.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Melilotus alba Desr.¹

Since 1880, white sweet clover has spread to most of the northern Rocky Mountains (Forcella and Harvey 1981). While it does occur in the area we did not see it in Teton.

This legume appears in dry grassland to moist forests habitat types. We did not find it in the high Abies forest or alpine zones

Melilotus is most prevalent at roadsides. While we have seen it in disturbed sites elsewhere our sample contained only one case (in BOGR). We did not see Melilotus in undisturbed native vegetation.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. On roadsides the frequency of Melilotus was 0-20% and its cover was 0-1%. On disturbed sites frequency was 0-20% and cover was 0-3%. Cover and frequency were zero in undisturbed vegetation.

Table 44. Distribution of Melilotus alba Desr. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
				shoulder			ditch sl			road cut			cleared			n-climax		
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	29.43.	7		.	.	.	50.10.	0.		50.20.	3.					.	.	.
AGSP-BOGR	0. 0.	8		.	.	.	.	.	.	.	.	.				.	.	.
FESC-FEID	10.10.	10		99.20.	1.		.	.	.	.	.	.				.	.	.
ARWY-FEID	0. 0.	10		.	.	.	.	.	.	.	.	.				.	.	.
ARVA-FEID	20.20.	10		50.20.	0.		50.10.	0.		.	.	.				.	.	.
PSME-SYAL	10.10.	10		99.20.	0.		.	.	.	.	.	.	.	.	.	.	.	.
PSME-PHMA	0. 0.	6		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POTR	0. 0.	8		.	.	.	.	.	.	.	.	.				.	.	.
THPL-OPHO	0. 0.	10		.	.	.	.	.	.							.	.	.
TSHE-CLUN	20.20.	10		99.20.	0.		.	.	.	.	.	.	.	.	.	.	.	.
ABLA-CLUN	0. 0.	9		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	10.10.	10		99.20.	0.		99.20.	0.		.	.	.	.	.	.	.	.	.
ABLA-ARCO	0. 0.	10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	0. 0.	10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0. 0.	10		.	.	.	.	.	.	.	.	.				.	.	.
ALPINE	0. 0.	11		.	.	.	.	.	.	.	.	.				.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Melilotus officinalis (L.)Lam.¹

Since 1880, yellow sweetclover has occupied most of the northern Rocky Mountains (Forcella and Harvey 1981). It occurs in all three study areas.

This legume can grow in most habitats from dry grasslands up through forests to mountain meadows. While we did not find it in the Thuja zone, we would expect it there. It is probably excluded from the alpine by cool temperatures.

Melilotus usually grows well in the non-competitive vegetation of roadsides, ditch slopes, and road cuts. While it can grow in near-climax vegetation of grassy habitats from dry grasslands to mountain meadows-- and especially in the BOGR and AGSP habitats-- it doesn't grow in climax vegetation of the sagebrush or conifer zones.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. On roadsides *Melilotus*' frequency was 0-99% and its cover was 0-88%. On disturbed sites its frequency was 0-99% and its cover was 0-2%. On undisturbed sites its frequency was 0-47% and its cover was 0-1%.

Table 45. Distribution of *Melilotus officinalis* (L.)Lam. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
	pc	sc	n	shoulder			ditch sl			road cut			cleared			n-climax		
				cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	99.99.	7		57.23.	0.		99.37.	2.		86.60.	1.					57.40.	1.	
AGSP-BOGR	75.99.	8		67.40.	2.		67.33.	1.		99.63.	1.					99.47.	0.	
FESC-FEID	90.90.	10		78.36.	0.		99.58.	1.		67.31.	0.					11.7.	0.	
ARWY-FEID	20.20.	10		99.20.	0.		.	.	.	.	.	.				.	.	.
ARVA-FEID	40.40.	10		99.30.	3.		25.5.	0.		.	.	.				.	.	.
PSME-SYAL	70.70.	10		71.60.	3.		99.57.	0.		43.26.	0.		.	.	.	.	.	.
PSME-PHMA	83.83.	6		60.32.	1.		60.40.	2.		60.16.	0.		.	.	.	.	.	.
POTR	99.99.	8		88.33.	0.		99.88.	4.		99.78.	2.					13.3.	0.	
THPL-OPHO	0.0.	10		.	.	.	.	.	.	.	.	.				.	.	.
TSHE-CLUN	40.40.	10		50.10.	0.		75.25.	0.		50.5.	0.		25.5.	0.		.	.	.
ABLA-CLUN	22.22.	9		50.10.	0.		.	.	.	50.30.	1.		.	.	.	.	.	.
ABLA-XETE	30.30.	10		67.20.	1.		33.7.	0.		33.7.	0.		.	.	.	.	.	.
ABLA-ARCO	40.40.	10		50.25.	0.		75.20.	0.		.	.	.	.	.	.	.	.	.
ABLA-VASC	40.40.	10		99.50.	2.		75.75.	5.		75.60.	17.		25.15.	1.		.	.	.
FEID-AGCA	70.70.	10		71.17.	1.		57.20.	0.		14.11.	0.					14.6.	0.	
ALPINE	0.0.	11		.	.	.	.	.	.	.	.	.				.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Phalaris arundinacea L.¹

Reed canary grass grows in moist meadows throughout the northern Rocky Mountains (Booth 1950). On our relatively well-drained sites we found it only once, in moist forest from Glacier.

Our location of the grass in the *Abies-Clintonia* habitat gives a minimum upper limit for its range. Given sufficient water it should grow in any lower zone.

Our failure to find *Phalaris* at roadsides may indicate that even with run-in water these sites are generally too dry for it. The grass grew well on one, perhaps sodden, roadside. It was never seen in undisturbed native vegetation.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. While *Phalaris* can dominate a site, the roadcut we found it on had a frequency of only 40% and a cover of 0%. We did not find *Phalaris* in either roadside or undisturbed zones.

Table 46. Distribution of *Phalaris arundinacea* L. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
	pc	sc	n	shoulder			ditch sl			road cut			cleared			n-climax		
				cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	0.	0.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AGSP-BOGR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FESC-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARWY-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARVA-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-SYAL	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-PHMA	0.	0.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POTR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
THPL-OPHO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
TSHE-CLUN	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-CLUN	11.	11.	9	.	.	.	.	.	.	99.	40.	0.	.	.	.	.	.	.
ABLA-XETE	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	0.	0.	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Phleum pratense L.¹

Timothy escapes commonly from seeded roadsides and hayfields throughout the region.

This grass ranges from dry grasslands through the alpine.

Occasional appearances of *Phleum* in on roadsides in dry grassland habitat types probably depend on water running off the road. From fescue grasslands on up to the alpine *Phleum* thrives at roadsides. The grass grows in all disturbed sites sampled except those in dry grassland (BOGR-AGSP) habitat types. *Phleum* escapes into undisturbed native vegetation in the rough fescue (FESC-FEID) open forests (PSME and POTR) and mountain meadows. It apparently does not invade dry grassland (BOGR and AGSP), sagebrush, wet forest, or alpine zones.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. At roadsides *Phleum*'s frequency was 0-96%, and its cover was 0-10%. In disturbed areas frequency was 0-88% and its cover was 0-6%. In near-climax sites it's frequency was 0-65% and its cover was 0-2%.

Table 47. Distribution of *Phleum pratense* L. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
	pc	sc	n	shoulder			ditch sl			road cut			cleared			n-climax		
				cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	14.14.	7		99.40.	0.		.	.	.	.	.	.				.	.	.
AGSP-BOGR	0. 0. 8			.	.	.	.	.	.	.	.	.				.	.	.
FESC-FEID	99.99.10			80.70.	1.		90.78.	2.		99.82.	2.					90.46.	1.	
ARWY-FEID	40.40.10			99.30.	1.		.	.	.	25.10.	0.					.	.	.
ARVA-FEID	70.70.10			99.29.	0.		29.17.	1.		.	.	.				.	.	.
PSME-SYAL	99.99.10			99.62.	3.		99.74.	3.		70.54.	2.		99.65.	0.		40.26.	0.	
PSME-PHMA	99.99. 6			67.37.	2.		67.43.	4.		83.73.	3.		75.30.	0.		50.13.	0.	
POTR	99.99. 8			99.58.	2.		99.88.	7.		99.88.	6.					99.65.	2.	
THPL-OPHO	70.70.10			71.46.	1.		86.54.	1.								.	.	.
TSHE-CLUN	99.99.10			90.64.	3.		80.64.	7.		90.72.	4.		10.10.	0.		.	.	.
ABLA-CLUN	99.99. 9			89.69.	3.		80.76.	9.		99.76.	2.		25. 5. 0.			.	.	.
ABLA-XETE	99.99.10			99.96.10.			90.80.	5.		99.68.	1.		40. 8. 0.			.	.	.
ABLA-ARCO	99.99.10			99.94.	7.		99.88.	5.		80.54.	1.		20.10.	0.		.	.	.
ABLA-VASC	99.99.10			90.82.	7.		90.68.	5.		80.50.	1.		30. 6. 0.			.	.	.
FEID-AGCA	99.99.10			60.32.	0.		99.60.	1.		70.40.	1.					60.30.	0.	
ALPINE	36.36.11			50.10.	0.		50.10.	0.		25. 5. 0.						.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Plantago lanceolata L.¹

While buckhorn plantain is reported only from southern Montana (Booth and Wright 1959), our location of it both in Glacier and Teton suggest that it is widespread in the northern Rocky Mountains.

On uplands this plantain's water requirement binds it to cool moist forests habitat types (Thuja-Tsuga-Abies). At streamsides it may invade lower and higher zones.

We found *Plantago* mostly on roadshoulders which provide a moist relatively competition-free existence. It also occurred on roadside ditch slopes, and once, on a strongly disturbed roadcut.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. At roadsides *Plantago*'s frequency was 0-50% and its cover was 0-30%. On one disturbed site its frequency was 20% and its cover was 0%. The species was absent from undisturbed native vegetation.

Table 48. Distribution of *Plantago lanceolata* L. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics															
				shoulder			ditch sl			road cut			cleared			n-climax			
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	
BOGR-STCO	0.	0.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AGSP-BOGR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FESC-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARWY-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARVA-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-SYAL	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-PHMA	0.	0.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POTR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
THPL-OPHO	40.	40.	10	99.	50.	3.	75.	25.	1.	.	.	.	.	.	.	.	.	.	.
TSHE-CLUN	10.	10.	10	99.	40.	0.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-CLUN	11.	11.	9	99.	20.	0.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	10.	10.	10	.	.	.	.	.	.	99.	20.	0.	.	.	.	.	.	.	.
ABLA-VASC	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	0.	0.	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Plantago major L.¹

Broadleaf plantain is present throughout the northern Rocky Mountains (Booth and Wright 1959). We found it in all three parks. Indians associated its presence with Caucasian invasion (Seaton).

We found this plantain on sites ranging from moist grassland habitat types (FESC-FEID) to high forests (ABLA). We did not find it in dry grassland habitat types (BOGR or AGSP) or mountain meadows and alpine.

Plantago is most prevalent on roadshoulders and, in moister areas, on ditch slopes. We found it once on a roadcut in a moist forest (*Tsuga*) habitat type.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. At roadsides, *Plantago*'s frequency is 0-96% and its cover is 0-15%. In disturbed areas frequency averaged 0-3% and cover averaged 0%. Plantain was not seen in undisturbed vegetation.

Table 49. Distribution of *Plantago major* L. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
	pc	sc	n	shoulder			ditch sl			road cut			cleared			n-climax		
				cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	0.	0.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AGSP-BOGR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FESC-FEID	40.	40.	10	75.	30.	0.	25.	5.	0.	.	.	.	.	.	.	.	.	.
ARWY-FEID	20.	20.	10	99.	30.	0.	.	.	.	.	.	.	.	.	.	.	.	.
ARVA-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-SYAL	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-PHMA	17.	17.	6	99.	60.	0.	.	.	.	.	.	.	.	.	.	.	.	.
POTR	50.	50.	8	50.	20.	1.	99.	50.	2.	.	.	.	.	.	.	.	.	.
THPL-OPHO	99.	99.	10	99.	96.	15.	80.	48.	3.	.	.	.	.	.	.	.	.	.
TSHE-CLUN	70.	70.	10	99.	71.	4.	71.	40.	2.	14.	3.	0.	.	.	.	.	.	.
ABLA-CLUN	67.	67.	9	99.	70.	3.	33.	7.	0.	.	.	.	.	.	.	.	.	.
ABLA-XETE	20.	20.	10	99.	40.	0.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	20.	20.	10	99.	40.	1.	99.	50.	1.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	0.	0.	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Poa compressa L.¹

Canada bluegrass occurs on heavy soils throughout the region (Booth 1950). We found it in all three areas.

We found this grass in habitat types ranging from dry grasslands to the alpine. It was absent only from Sagebrush sites in Teton-- perhaps because their gravely soils are too well drained.

Poa grew on most roadside sites. It occupied most heavily disturbed (roadcut) sites, but no lightly disturbed (devegetated) sites. On undisturbed sites the species was occasionally found in the cool moist grassland (FESC-FEID), open forest (PSME), and the alpine zones.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. At roadsides *Poa*'s frequency was 0-83% and its cover was 0-6%. On disturbed areas its frequency was 0-53% and its cover was 0-2%. In near climax vegetation its frequency was 0-12% and its cover was 0%.

Table 50. Distribution of *Poa compressa* L. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
	pc	sc	n	shoulder			ditch sl			road cut			cleared			n-climax		
				cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	29.43.	7		.	.	.	99.50.	4.		50.10.	0.					.	.	.
AGSP-BOGR	38.50.	8		67.27.	0.		.	.	.	33.20.	0.					.	.	.
FESC-FEID	99.99.	10		90.68.	3.		80.34.	1.		60.30.	2.					10.	6.	0.
ARWY-FEID	0. 0.	10		.	.	.	.	.	.	.	.	.				.	.	.
ARVA-FEID	0. 0.	10		.	.	.	.	.	.	.	.	.				.	.	.
PSME-SYAL	50.50.	10		60.40.	2.		40.28.	1.		20. 4.	0.		.	.	.	20.12.	0.	
PSME-PHMA	67.83.	6		50.15.	0.		75.25.	1.		25.10.	0.		.	.	.	.	.	.
POTR	99.99.	8		99.83.	6.		99.80.	5.		88.53.	2.					.	.	.
THPL-OPHO	10.10.	10		99.40.	3.		.	.	.							.	.	.
TSHE-CLUN	90.90.	10		99.60.	2.		44.11.	0.		11. 2.	0.		.	.	.	.	.	.
ABLA-CLUN	78.78.	9		86.40.	1.		25. 5.	0.		14. 3.	0.		.	.	.	.	.	.
ABLA-XETE	90.90.	10		44.16.	0.		89.22.	0.		33.11.	0.		.	.	.	.	.	.
ABLA-ARCO	60.60.	10		50.27.	2.		67.17.	0.		17. 3.	0.		.	.	.	.	.	.
ABLA-VASC	20.20.	10		.	.	.	99.30.	1.		.	.	.	.	.	.	.	.	.
FEID-AGCA	50.50.	10		60.28.	2.		60.32.	2.		20. 4.	0.					.	.	.
ALPINE	27.27.	11		67.40.	0.		33. 7.	0.		.	.	.				33. 7.	0.	

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Poa pratensis L.¹

Kentucky bluegrass is widespread on well drained soils in the northern Rocky Mountains. It was found in all three parks.

The grass ranges from dry grassland habitat types to subalpine meadows. We did not find it in the alpine.

Poa thrives on roadsides at all altitudes except the alpine-- its success here is poorest on road shoulders in the *Festuca scabrella* habitat type. Bluegrass does well on heavily disturbed areas throughout and on lightly disturbed areas except in moist forests. The species invades undisturbed sites grass-shrublands and open forests; it does best in fescue grasslands and *Artemisia-Festuca* shrublands, and *Pseudotsuga* forests. It does not invade forest sites where competition is overwhelming.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. At roadsides, *Poa* frequency was 0-98% and cover was 1-26%. On disturbed sites frequencies were 0-80% and cover was 0-8%. In undisturbed vegetation frequency was 0-72% and cover was 0-12%.

Table 51. Distribution of *Poa pratensis* L. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
	pc	sc	n	shoulder			ditch sl			road cut			cleared			n-climax		
				cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	99.99.	7		99.86.	5.		99.77.	9.		43.37.	6.					29.11.	0.	
AGSP-BOGR	99.99.	8		99.78.	5.		99.68.	9.		50.45.	6.					25.13.	0.	
FESC-FEID	90.90.	10		.	.	.	78.40.	2.		89.76.	4.					67.27.	1.	
ARWY-FEID	99.99.	10		99.98.	26.		99.98.	16.		99.74.	6.					90.70.	7.	
ARVA-FEID	99.99.	10		99.94.	11.		99.94.	9.		99.80.	8.					90.72.	12.	
PSME-SYAL	99.99.	10		70.54.	5.		90.76.	7.		70.38.	2.		99.50.	4.		90.56.	1.	
PSME-PHMA	99.99.	6		99.83.	9.		99.87.	4.		67.33.	2.		99.75.	3.		83.37.	1.	
POTR	99.99.	8		88.23.	1.		88.58.	5.		75.35.	1.					13.8.	0.	
THPL-OPHO	99.99.	10		99.94.	15.		99.94.	14.								.	.	.
TSHE-CLUN	99.99.	10		60.32.	1.		90.58.	4.		40.20.	0.		.	.	.	.	.	.
ABLA-CLUN	99.99.	9		67.51.	3.		99.36.	2.		67.47.	1.		.	.	.	.	.	.
ABLA-XETE	80.80.	10		75.43.	2.		88.70.	5.		88.28.	0.		20.4.	0.		.	.	.
ABLA-ARCO	99.99.	10		99.98.	20.		99.76.	7.		50.24.	1.		10.2.	0.		.	.	.
ABLA-VASC	99.99.	10		90.74.	11.		90.54.	3.		40.30.	1.		30.20.	0.		.	.	.
FEID-AGCA	99.99.	10		90.76.	3.		90.68.	3.		70.40.	3.					50.22.	0.	
ALPINE	0.0.	11		.	.	.	.	.	.	.	.	.				.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Polygonum achoreum Blake¹

Knotweed appears occasionally throughout the region (Booth and Wright 1959) and was found in all three parks.

In our samples this buckwheat occurred only at low altitude, ie in AGSP, ARTR, and FESC-FEID habitat types. *Polygonum* was found principally on road shoulders and occurred once on the bank of a ditch. It did not invade disturbed sites or undisturbed vegetation.

Polygonum was found principally on roadshoulders and occurred once on the bank of a ditch. It did not invade disturbed sites or undisturbed vegetation.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. On roadsides, frequencies were 0-99% and cover was 0-29%. We did not find *Polygonum* on disturbed or undisturbed sites.

Table 52. Distribution of *Polygonum achoreum* Blake by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics															
				shoulder			ditch sl			road cut			cleared			n-climax			
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	
BOGR-STCO	0.	0.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AGSP-BOGR	13.	13.	8	99.	40.	0.	.	.	.	.	.	.	.	.	.	.	.	.	.
FESC-FEID	10.	10.	10	99.	99.	1.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARWY-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARVA-FEID	10.	10.	10	99.	99.	29.	99.	20.	0.	.	.	.	.	.	.	.	.	.	.
PSME-SYAL	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-PHMA	0.	0.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POTR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
THPL-OPHO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
TSHE-CLUN	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-CLUN	0.	0.	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	0.	0.	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Polygonum aviculare L.¹

While prostrate knotweed is found throughout the northern Rocky Mountains (Booth and Wright 1959), we failed to find it in Glacier.

This buckwheat ranges from mesic grasslands through open forests to mountain meadows. We did not find it in dry *Bouteloua* or *Festuca* grasslands, in wet *Populus-Thuja-Tsuga-Abies* forests, or in the alpine.

Polygonum thrives at roadsides. It grows almost as well on roadcuts and is sometimes present in the more competitive (less disturbed) zone. It invades *Artemisia-Festuca* shrublands and *Festuca idahoensis* -*Agropyron caninum* meadows.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. At roadsides *Polygonum*'s frequency was 0-60% and its cover was 0-4%. in disturbed areas frequency was 0-66% and its cover was 0-1%. In undisturbed areas its frequency was 0-70% and its cover was 0-1%.

Table 53. Distribution of *Polygonum aviculare* L. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
				shoulder			ditch sl			road cut			cleared			n-climax		
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	14.14.	7		99.40.	0.		.	.	.	.	.	.				.	.	.
AGSP-BOGR	38.38.	8		67.60.	2.		.	.	.	33.	7.	0.				.	.	.
FESC-FEID	0.	0.10		.	.	.	.	.	.	.	.	.				.	.	.
ARWY-FEID	99.99.	10		50.22.	0.		90.40.	1.		90.66.	1.					99.70.	1.	
ARVA-FEID	70.70.	10		86.40.	4.		43.14.	1.		57.34.	1.					43.11.	0.	
PSME-SYAL	30.30.	10		99.53.	0.		33.13.	0.		.	.	.	.	.	.	.	.	.
PSME-PHMA	17.17.	6		99.60.	0.		.	.	.	.	.	.	.	.	.	.	.	.
POTR	0.	0.8		.	.	.	.	.	.	.	.	.				.	.	.
THPL-OPHO	0.	0.10		.	.	.	.	.	.							.	.	.
TSHE-CLUN	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-CLUN	0.	0.9		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	40.40.	10		99.35.	1.		50.15.	0.		.	.	.	.	.	.	.	.	.
ABLA-VASC	60.60.	10		83.47.	2.		67.47.	2.		67.17.	0.		50.23.	0.		.	.	.
FEID-AGCA	60.60.	10		33.20.	2.		83.40.	2.		.	.	.				33.23.	0.	
ALPINE	0.	0.11		.	.	.	.	.	.	.	.	.				.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Prunella vulgaris L.¹

While common selfheal is widespread in the northern Rocky Mountains (Booth and Wright 1959), it did not occur in our Yellowstone and Teton samples.

This mint is most common in wet habitat types like Thuja and Tsuga forests. It appearance in a Festuca scabrella grassland surely indicates a good supply of supplemental water, perhaps road runoff. We did not find the species in dry grassland-shrubland, in the cool Abies forests, or in high meadow-alpine sites.

Prunella occupies roadside (shoulder and ditch) sites. While it can occupy heavily disturbed sites we didn't record it in less disturbed secondary succession or near-climax sites.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. *Prunella*'s frequency on roadside sites was 0-73% and its cover was 0-5%. In disturbed roadcut areas frequency was 0-20% and cover was 0%. In near-climax areas the plant was absent.

Table 54. Distribution of *Prunella vulgaris* L. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
				shoulder			ditch sl			road cut			cleared			n-climax		
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	0.	0.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AGSP-BOGR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FESC-FEID	10.	10.	10	99.	20.	0.	.	.	.	.	.	.	.	.	.	.	.	.
ARWY-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARVA-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-SYAL	0.	10.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-PHMA	0.	0.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POTR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
THPL-OPHO	60.	60.	10	83.	63.	2.	99.	73.	5.	.	.	.	.	.	.	.	.	.
TSHE-CLUN	70.	70.	10	86.	60.	3.	86.	54.	2.	57.	20.	1.	.	.	.	.	.	.
ABLA-CLUN	0.	0.	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	0.	0.	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Rumex acetosella L.¹

Sheep sorrel occurs throughout the region (Booth and Wright 1966) and was found in all three parks.

This buckwheat ranges from sagebrush (ARWY) steppe through open subalpine (ABLA) forests to the alpine. We did not find it in dry grasslands.

Rumex occupies constantly disturbed roadsides, once disturbed roadcuts, and climax vegetation. In undisturbed vegetation it only thrives where an overstory is absent and it does better under cool moist (alpine) than warmer drier (sagebrush) conditions.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. *Rumex*'s frequency on roadside sites was 0-80% and its cover was 0-9%. In disturbed roadcut areas frequency was 0-15% and cover was 0%. In near-climax areas frequencies were 0-75% and cover was 0%.

Table 53. Distribution of *Rumex acetosella* L. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics															
				shoulder			ditch			sl			road cut			cleared			n-climax
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	
BOGR-STCO	0.	0.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AGSP-BOGR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FESC-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARWY-FEID	99.	99.	10	90.	70.	4.	90.	62.	2.	90.	60.	3.	.	.	.	.	20.	4.	0.
ARVA-FEID	99.	99.	10	90.	80.	7.	99.	90.	9.	90.	62.	3.	.	.	.	.	.	.	.
PSME-SYAL	0.	10.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-PHMA	0.	0.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POTR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
THPL-OPHO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
TSHE-CLUN	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-CLUN	0.	0.	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	20.	20.	10	.	.	.	50.	10.	0.	50.	10.	0.	.	.	.	.	.	.	.
ABLA-ARCO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	36.	36.	11	50.	5.	0.	50.	15.	0.	25.	15.	0.	.	.	.	.	75.	15.	0.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Rumex crispus L.¹

Since 1890 curly dock has spread to occupy most of the northern Rocky Mountains (Forcella and Harvey 1981). We found it in Glacier and Teton but not in Yellowstone. The plant is considered noxious in Oregon.

This polygon occurred occasionally in the forest zone; in *Populus* stands at low altitude and in *Abies* stands at high altitude. We did not see it in dry grass-shrublands or in the alpine.

In both habitats the species appeared on the ditch slope and no other zones. The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. In the roadside zone its frequency was 0-80% and its cover was 0-3%. The species was not seen in either disturbed or undisturbed vegetation.

Table 56. Distribution of *Rumex crispus* L. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
				shoulder			ditch sl			road cut			cleared			n-climax		
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	0.	0.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AGSP-BOGR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FESC-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARWY-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARVA-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-SYAL	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-PHMA	0.	0.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POTR	13.	13.	8	.	.	.	99.	80.	3.	.	.	.	.	.	.	.	.	.
THPL-OPHO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
TSHE-CLUN	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-CLUN	0.	0.	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	20.	20.	10	.	.	.	99.	20.	1.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	0.	0.	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Salsola kali L.¹

Since 1880, russian thistle has spread to most of the northern Rocky Mountains. Despite its absence from our samples, it probably occurs in both Glacier and Teton. The plant is considered noxious in Alberta, Saskatchewan, and Oregon.

This chenopod is concentrated in the dry grassland area, but may range into moister sites such as the *Pseudotsuga* (where we recorded it) or sagebrush zones. It is unlikely to spread to moist or cool habitat types.

Salsola occupies roadside sites. In the dry habitat types it can occupy disturbed (roadcut) sites and near-climax sites.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. At the roadside *Salsola* frequency was 0-20% and cover was 0%. On disturbed sites, frequency was 0-33% and cover was 0%. On undisturbed sites frequency was 0-20% and cover was 0%.

Table 57. Distribution of *Salsola kali* L. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.	Zonal statistics											
		shoulder			ditch sl			road cut			cleared		
	pc sc n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	43.57. 7	67.20.	0.		33. 7.	0.		33.33.	0.			33.13.	0.
AGSP-BOGR	13.13. 8	.	.	.	.	.	.	.	.	.		99.20.	0.
FESC-FEID	0. 0.10	.	.	.	.	.	.	.	.	.		.	.
ARWY-FEID	0. 0.10	.	.	.	.	.	.	.	.	.		.	.
ARVA-FEID	0. 0.10	.	.	.	.	.	.	.	.	.		.	.
PSME-SYAL	10.10.10	.	.	.	99.20.	0.		.	.	.	.	.	.
PSME-PHMA	0. 0. 6	.	.	.	.	.	.	.	.	.	.	.	.
POTR	0. 0. 8	.	.	.	.	.	.	.	.	.	.	.	.
THPL-OPHO	0. 0.10	.	.	.	.	.	.	.	.	.	.	.	.
TSHE-CLUN	0. 0.10	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-CLUN	0. 0. 9	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	0. 0.10	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	0. 0.10	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	0. 0.10	.	.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0. 0.10	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	0. 0.11	.	.	.	.	.	.	.	.	.	.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Setaria viridis (L.)Beauv.¹

Green bristlegrass is widespread in the northern Rocky Mountains. Despite its wide distribution we did not find it in either Glacier or Teton. The plant is considered noxious in Alberta and Saskatchewan.

The grass was found in dry grasslands and open forest habitat types. We did not find it in moist Thuja-Tsuga forests, cool Abies forests, or the alpine.

Setaria appeared only at roadsides. It did not invade disturbed zone or near-climax vegetation.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. At roadsides frequency was 0-80% and cover was 0-30%. *Setaria* was absent from disturbed and undisturbed sites.

Table 58. Distribution of *Setaria viridis* (L.)Beauv. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
				shoulder			ditch sl			road cut			cleared			n-climax		
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	14.14.	7		99.80.	3.		.	.	.	.	.	.				.	.	.
AGSP-BOGR	13.13.	8		99.20.	0.		.	.	.	.	.	.				.	.	.
FESC-FEID	0.	0.10		.	.	.	.	.	.	.	.	.				.	.	.
LOW SAGE	0.	0.10		.	.	.	.	.	.	.	.	.				.	.	.
ARVA-FEID	0.	0.10		.	.	.	.	.	.	.	.	.				.	.	.
PSME-SYAL	10.10.	10		.	.	.	99.20.	0.		.	.	.	.	.	.	.	.	.
PSME-PHMA	17.17.	6		99.80.	1.		.	.	.	.	.	.	.	.	.	.	.	.
POTR	0.	0. 8		.	.	.	.	.	.	.	.	.				.	.	.
THPL-OPHO	0.	0.10		.	.	.	.	.	.	.	.	.				.	.	.
TSHE-CLUN	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-CLUN	0.	0. 9		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	0.	0.11		.	.	.	.	.	.	.	.	.				.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Silene vulgaris (Moench)Gurcke (= *S. cucubalus* Wibel.)¹

Since 1930, bladder campion has spread to most of the northern Rocky Mountains (Forcella and Harvey 1981). Despite this range we found the species only in Glacier. The plant is considered noxious in Alberta and Saskatchewan.

We found this Caryophyll in the foist forest habitat types (*Tsuga-Abies*) of Glacier. We see it often in warmer *Festuca idahoensis* habitat types. It is apparently excluded from dry shrub-grassland areas as well as high cool forests and the alpine.

Silene appeared at roadsides and on some disturbed (road cut) sites. Its invasion of the consolidated vegetation of less disturbed sites and near-climax vegetation is apparently slight.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. At roadsides *Silene's* frequency was 0-15% and cover was 0-1%. On disturbed sites its frequency was 16-30%. The plant did not appear in climax vegetation we examined.

Table 59. Distribution of *Silene vulgaris* (Moench)Gurcke by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
	pc	sc	n	shoulder			ditch sl			road cut			cleared			n-climax		
				cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	0.	0.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AGSP-BOGR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FESC-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARWY-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARVA-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-SYAL	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-PHME	0.	0.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POTR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
THPL-OPHO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
TSHE-CLUN	50.	50.	10	40.	8.	1.	60.	12.	1.	60.	16.	0.	.	.	.	.	.	.
ABLA-CLUN	44.	44.	9	50.	15.	0.	.	.	.	75.	30.	1.	.	.	.	.	.	.
ABLA-XETE	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	0.	0.	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Sisymbrium altissimum L.¹

Since 1880, tumble-mustard has spread to most of the northern Rocky Mountains (Forcella and Harvey 1981). Despite its wide range, we found it only in the Yellowstone area. The plant is considered noxious in Alberta and Saskatchewan.

This mustard is concentrated in the dry grassland habitat types (BOGR and AGSP). It occurred once in an open *Pseudotsuga* habitat type, but is not expected in moist forests, cool forests, or the alpine.

Sisymbrium appears at roadsides, in disturbed (roadcut) areas and in near-climax grasslands.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. At roadsides, frequency was 0-20% and cover was 0%. On disturbed sites frequency was 7-32% and cover was 0%. In undisturbed vegetation, frequency was 1-13% and cover was 0%.

Table 60. Distribution of *Sisymbrium altissimum* L. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
				shoulder			ditch sl			road cut			cleared			n-climax		
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	71.86	.	7	20.20	0.		60.16	0.		60.32	0.					60.12	0.	
AGSP-BOGR	38.50	.	8	33.13	0.		33.	0.	0.	33.	7.	0.				33.13	0.	
FESC-FEID	0.	0.10		.	.	.	.	.	.	.	.	.				.	.	.
ARWY-FEID	0.	0.10		.	.	.	.	.	.	.	.	.				.	.	.
ARVA-FEID	0.	0.10		.	.	.	.	.	.	.	.	.				.	.	.
PSME-SYAL	10.10	0.10		.	.	.	99.60	0.		.	.	.	.	.	.	.	.	.
PSME-PHME	0.	0.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POTR	0.	0.	8	.	.	.	.	.	.	.	.	.				.	.	.
THPL-OPHO	0.	0.10		.	.	.	.	.	.							.	.	.
TSHE-CLUN	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-CLUN	0.	0.	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	0.	0.11		.	.	.	.	.	.	.	.	.				.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Sisymbrium loeselii L.¹

Since 1930, tall hedge mustard has developed a patchy distribution that covers most of the northern Rocky Mountain area. We record it as a sporadic in the Yellowstone area, but did not find it in either Teton or Glacier.

Like *Sisymbrium altissimum*, this cousin is concentrated in dry grassland habitat types. In our samples it occurred once in an adjacent open *Pseudotsuga* habitat type.

The species establishes in roadsides, disturbed sites, and undisturbed native grasslands.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. At roadsides frequency was 0-7% and cover was 0%. In disturbed areas frequency was 0-20% and cover was 0%. In undisturbed vegetation frequency was 0-27% and cover was 0%.

Table 61. Distribution of *Sisymbrium loeselii* L. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
				shoulder			ditch sl			road cut			cleared			n-climax		
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	43.43.	7		33.	7.	0.	.	.	.	.	.	.				67.27.	0.	
AGSP-BOGR	13.13.	8		.	.	.	.	.	.	99.20.	0.					.	.	.
FESC-FEID	0.	0.10		.	.	.	.	.	.	.	.	.				.	.	.
ARWY-FEID	0.	0.10		.	.	.	.	.	.	.	.	.				.	.	.
ARVA-FEID	0.	0.10		.	.	.	.	.	.	.	.	.				.	.	.
PSME-SYAL	10.10.	10		.	.	.	99.20.	0.		.	.	.	.	.	.	.	.	.
PSME-PHMA	0.	0.6		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POTR	0.	0.8		.	.	.	.	.	.	.	.	.				.	.	.
THPL-OPHO	0.	0.10		.	.	.	.	.	.	.	.	.				.	.	.
TSHE-CLUN	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-CLUN	0.	0.9		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	0.	0.10		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0.	0.10		.	.	.	.	.	.	.	.	.				.	.	.
ALPINE	0.	0.11		.	.	.	.	.	.	.	.	.				.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Spergularia rubra (L.)Presl¹.

Red spurry is a common and abundant European weed of waste places (Hitchcock and Cronquist 1973). The plant is considered noxious in Alberta.

Our single record of this carnation was on one steppe (ARVA-FEID) site.

The infection was localized on the roadshoulder.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. *Spergularia* appeared in only one roadshoulder quadrat and offered no measurable cover there. It did not appear in any other disturbance zone.

Table 62. Distribution of *Spergularia rubra* (L.)Presl by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics															
				shoulder			ditch sl			road cut			cleared			n-climax			
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	
BOGR-STCO	0.	0.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AGSP-BOGR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FESC-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARWY-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
BIG SAGE	10.	10.	10	99.	20.	0.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-SYAL	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-PHMA	0.	0.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POTR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
THPL-OPHO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
TSHE-CLUN	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-CLUN	0.	0.	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	0.	0.	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Tanacetum vulgare L.¹

Since its entry in 1930, Tansey has spread to most of the northern Rocky Mountains (Forcella and Harvey 1981). It appeared in our samples only in Teton. The plant is considered noxious in Alberta, Washington, and British Columbia.

We found tansey in a high *Abies* forest, but this vastly under-represents its altitudinal range. [It may be capable of growing in all the vegetation zones down to *Festuca idahoensis* and *Agropyron spicatum* environments (HTs) where it is common on cultivated and go-back sites.] It may well be excluded from the lower grassland habitat types by drought.

While our single occurrence of Tansey was on a roadside, it can spread into cultivated and seral areas in *Festuca idahoensis* habitats.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. The 20% frequency and 0% cover observed at our roadside site are deceptively low. We did not find Tansey in disturbed or undisturbed sites.

Table 63. Distribution of *Tanacetum vulgare* L. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
				shoulder			ditch sl			road cut			cleared			n-climax		
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	0.	0.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AGSP-BOGR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FESC-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARWY-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARVA-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-SYAL	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-PHMA	0.	0.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POTR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
THPL-OPHO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
TSHE-CLUN	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-CLUN	0.	0.	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	10.	10.	10	.	.	.	99.	20.	0.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	0.	0.	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Taraxacum officinale Weber.¹

Common dandelion is widespread in the northern Rocky Mountains (Booth and Wright 1959). The plant is considered noxious in Alberta and Saskatchewan.

This composite is one of the few exotics capable of reaching without interruption from the dry grassland zone to the alpine.

Taraxacum thrives at roadside sites. It grows in most disturbed site (seral) communities. It is present in all open native vegetation types ie, in dry grassland (probably including FESC-FEID), sagebrush, *Pseudotsuga*, *Populus*, high meadows, and the alpine. Dandelions are absent from very competitive thick forests.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. At roadsides frequency was 8-94% and cover was 0-12%. In disturbed (seral) sites frequency was 0-84% and cover was 0-5%. In near-climax vegetation frequency was 0-40% and cover was 0%.

Table 64. Distribution of *Taraxacum officinale* Weber. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.	Zonal statistics														
		shoulder			ditch sl			road cut			cleared			n-climax		
		pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	43.57. 7				33.27.	0.		67.20.	0.					33.13.	0.	
AGSP-BOGR	63.75. 8				40. 8.	0.		40.12.	0.		40. 4.	0.		60.32.	0.	
FESC-FEID	90.90.10				99.58.	0.		89.38.	1.		33. 9.	0.				
ARWY-FEID	99.99.10				99.70.	3.		80.34.	1.					10. 2.	0.	
ARVA-FEID	70.70.10				99.57.	1.		86.37.	2.		71.34.	1.		29. 9.	0.	
PSME-SYAL	99.99.10				99.78.	1.		90.54.	1.		80.66.	2.	99.55.	0.	70.40.	0.
PSME-PHMA	83.99. 6				60.48.	2.		60.52.	1.		99.56.	0.	67.33.	0.	60.24.	0.
POTR	99.99. 8				99.95.12.			99.88.	6.		88.38.	0.			50.18.	0.
THPL-OPHO	99.99.10				99.99.12.			99.94.	8.						10. 2.	0.
TSHE-CLUN	99.99.10				99.72.	4.		90.64.	5.		90.40.	1.	20. 4.	0.		
ABLA-CLUN	99.99. 9				99.76.	4.		99.68.	3.		89.53.	2.	25. 5.	0.		
ABLA-XETE	99.99.10				99.92.	8.		90.64.	3.		50.28.	1.				
ABLA-ARCO	99.99.10				99.88.	5.		99.86.	5.		99.84.	5.	99.76.	2.		
ABLA-VASC	99.99.10				99.76.	5.		99.82.	4.		80.64.	3.	80.48.	2.		
FEID-AGCA	99.99.10				90.88.	7.		99.88.	5.		99.60.	1.			60.32.	0.
ALPINE	91.99.11				90.62.	1.		80.60.	1.		40.10.	0.			10. 2.	0.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Thlaspi arvense L.¹

Since 1880, penny cress (fanweed) has occupied most of the northern Rocky Mountains (Forcella and Harvey 1981). However, it appeared in our sample plots only in the Yellowstone area. The plant is considered noxious in Alberta and Saskatchewan.

While our data suggest that this mustard is restricted to the *Pseudotsuga* zone, we have also seen it in moister (FEID-ARTE) grasslands. In our samples, *Thlaspi* appeared at roadsides, disturbed areas, and in open undisturbed forest.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. At roadsides, frequency was 0-40 and cover was 0%. In disturbed sites frequency was 0-20% and cover was 0%. In undisturbed sites frequency was 0-20% and cover was 0%.

Table 65. Distribution of *Thlaspi arvense* L. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
				shoulder			ditch sl			road cut			cleared			n-climax		
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	0.	0.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AGSP-BOGR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FESC-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARWY-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARVA-FEID	10.	10.	10	.	.	.	.	.	.	99.	20.	0.	.	.	.	.	.	.
PSME-SYAL	10.	20.	10	99.	40.	0.	99.	20.	0.	.	.	.	.	.	.	99.	20.	0.
PSME-PHMA	17.	17.	6	.	.	.	.	.	.	99.	20.	0.	.	.	.	.	.	.
POTR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
THPL-OPHO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
TSHE-CLUN	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-CLUN	0.	0.	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	10.	10.	10	.	.	.	.	.	.	99.	20.	0.	.	.	.	.	.	.
ALPINE	0.	0.	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Tragopogon dubius Scop.¹

Since 1920, western salsify has spread to most of the northern Rocky Mountains (Forcella and Harvey 1981). This composite has a wide altitudinal range, extending from dry grasslands to mountain meadows. It was totally absent only from very moist forests (Thuja) and the alpine.

Tragopogon occupies roadside sites in most habitat types. It occupies roadcuts in most habitat types but it was absent in less disturbed sites (secondary succession) in the closed forest zone. In open near climax vegetation *Tragopogon* did well, but it was absent from closed forests, meadows, and the alpine.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. At roadsides *Tragopogon*'s frequency was 0-51% and its cover was 0-1%. At disturbed sites frequency was 0-40% and cover was 0-1%. In near-climax vegetation its frequency was 0-49% and its cover was 0-1%.

Table 66. Distribution of *Tragopogon dubius* Scop. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
	pc	sc	n	shoulder			ditch sl			road cut			cleared			n-climax		
				cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	71.86.	7		60.28.	0.		.	.	.	40.12.	0.					80.40.	1.	
AGSP-BOGR	88.88.	8		14. 3.	0.		57. 6.	0.		99.23.	0.					99.49.	1.	
FESC-FEID	50.50.	10		20. 8.	0.		60.20.	0.		80.24.	0.					40. 8.	0.	
ARWY-FEID	90.90.	10		78.40.	1.		78.40.	0.		11. 2.	0.					22. 4.	0.	
ARVA-FEID	90.90.	10		78.31.	1.		89.51.	0.		56.20.	0.					33. 9.	0.	
PSME-SYAL	50.50.	10		20. 4.	0.		60.12.	0.		40. 8.	0.		67.13.	1.		.	.	.
PSME-PHMA	67.83.	6		.	.	.	.	.	.	50.15.	0.		67.27.	0.		25. 5.	0.	
POTR	13.13.	8		.	.	.	.	.	.	99.40.	0.					.	.	.
THPL-OPHO	0. 0.	10		.	.	.	.	.	.							.	.	.
TSHE-CLUN	50.50.	10		40.12.	0.		80.12.	0.		20. 4.	0.		.	.	.	.	.	.
ABLA-CLUN	33.33.	9		33. 7.	0.		33. 7.	0.		67.13.	0.		.	.	.	.	.	.
ABLA-XETE	40.40.	10		99.40.	0.		25.10.	0.		.	.	.	.	.	.	.	.	.
ABLA-ARCO	20.20.	10		.	.	.	50.10.	0.		50.20.	1.		.	.	.	.	.	.
ABLA-VASC	10.10.	10		.	.	.	.	.	.	99.20.	0.		.	.	.	.	.	.
FEID-AGCA	10.10.	10		.	.	.	99.20.	1.		.	.	.				.	.	.
ALPINE	0. 0.	11		.	.	.	.	.	.	.	.	.				.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Trifolium agrarium L.¹

Since 1930, yellow clover (hop clover) has occupied the northwest corner of Montana and adjacent Idaho (Forcella and Harvey 1981). We found it in Glacier but not in Teton or in the Yellowstone area.

This legume occupies the warm moist forest zone including Thuja, Tsuga, and low Abies habitat types. We did not find it either in lower dry grasslands, sagebrush, and dry Pseudotsuga forests or in higher Abies forests, mountain meadows, or the alpine.

Trifolium is well represented at roadsides, less well represented in disturbed areas, and absent from undisturbed native vegetation.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. At infected roadsides trifolium frequency was 0-55% and its cover was 0-1%. In disturbed areas its cover was 0-35% and its cover was 0-1%. The species was absent from undisturbed sites.

Table 67. Distribution of *Trifolium agrarium* L. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
				shoulder			ditch sl			road cut			cleared			n-climax		
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	0.	0.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AGSP-BOGR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FESC-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARWY-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARVA-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-SYAL	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-PHMA	0.	0.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POTR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
THPL-OPHO	40.	40.	10	25.	5.	0.	99.	55.	1.	.	.	.	.	.	.	.	.	.
TSHE-CLUN	40.	40.	10	.	.	.	75.	20.	0.	50.	35.	1.	50.	10.	0.	.	.	.
ABLA-CLUN	11.	11.	9	99.	40.	0.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	0.	0.	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Trifolium hybridum L.¹

Alsake clover in the northern Rocky Mountain region is spottily distributed and probably still spreading (Forcella and Harvey 1981). We found it in all three parks.

This legume ranged from moist grasslands (FEID-FESC-FEID-ARTE) through open dry forests (PSME), warm moist forests (THUJA-TSUGA) and cool forests (ABIES) to mountain meadows. We did not find it in dry (BOGR-AGSP) grasslands or the alpine.

Trifolium thrives at roadsides and spreads well into highly disturbed sites (roadcuts), but invades less disturbed sites much less well and may not enter undisturbed sites.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. *Trifolium* had a roadside frequency of 0-40% and a cover of 0-1%. At disturbed sites the frequency was 0-99% and cover was 0-1%. The legume was never observed in undisturbed vegetation.

Table 68. Distribution of *Trifolium hybridum* L. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.	Zonal statistics														
		shoulder			ditch sl			road cut			cleared			n-climax		
		pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	0. 0. 7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AGSP-BOGR	0. 0. 8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FESC-FEID	30.30.10	.	.	.	67.13.	0.	67.13.	0.	.	.	.	.	.	.	.	.
ARWY-FEID	10.10.10	99.80.	8.	99.40.	0.	.	.	.	.	.	.	.	.	.	.	.
ARVA-FEID	0. 0.10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-SYAL	30.30.10	33.13.	0.	33.13.	0.	33.20.	0.	50.20.	0.	.	.	.	.	.	.	.
PSME-PHMA	0. 0. 6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POTR	88.88. 8	43.11.	0.	71.46.	2.	29.20.	1.	.	.	.	.	.	.	.	.	.
THPL-OPHO	10.10.10	99.20.	0.	99.20.	1.	.	.	.	.	.	.	.	.	.	.	.
TSHE-CLUN	90.90.10	44.24.	1.	78.40.	2.	99.58.	3.	11.11.	1.	.	.	.	.	.	.	.
ABLA-CLUN	99.99. 9	56.40.	1.	99.80.	8.	89.58.	3.	.	.	.	.	.	.	.	.	.
ABLA-XETE	80.80.10	88.45.	2.	99.53.	5.	75.55.	3.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	90.90.10	99.53.	3.	89.78.17.	89.71.12.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	99.99.10	80.54.	7.	60.58.	9.	80.60.	7.	40.16.	0.	.	.	.	.	.	.	.
FEID-AGCA	90.90.10	78.44.	2.	78.60.	5.	67.24.	1.	.	.	.	.	.	.	.	.	.
ALPINE	0. 0.11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Trifolium pratensis L.¹

Red clover is widely distributed in the northern Rocky Mountains (Booth and Wright 1959). We found it in all three parks.

This legume enjoys the moist conditions of the forest zone from *Pseudotsuga* through *Abies*. It was absent from lower dry grassland, sagebrush zones and higher mountain meadow, and alpine zones. One *Festuca scabrella* site was occupied.

Trifolium does well at roadsides and almost equally well on disturbed sites, but invades undisturbed vegetation only in the *Pseudotsuga* zone.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. At infected roadsides *Trifolium* frequency was 0-75% and cover was 0-8%. At disturbed sites frequency was 0-65% and cover was 0-3%. At near-climax sites frequency was 0-20% and cover was 0-1%.

Table 69. Distribution of *Trifolium pratense* L. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics															
				shoulder			ditch sl			road cut			cleared			n-climax			
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	
BOGR-STCO	0.	0.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AGSP-BOGR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FESC-FEID	10.	10.	10	.	.	.	99.	40.	0.	.	.	.	.	.	.	.	.	.	.
ARWY-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARVA-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-SYAL	50.	60.	10	.	.	.	60.	12.	0.	80.	24.	1.	50.	50.	3.	40.	20.	1.	.
PSME-PHMA	33.	67.	6	50.	40.	1.	50.	50.	0.	50.	30.	0.	99.	0.	0.	50.	10.	0.	.
POTR	25.	25.	8	.	.	.	99.	20.	1.	.	.	.	.	.	.	.	.	.	.
THPL-OPHO	80.	80.	10	25.	8.	0.	88.	75.	6.	.	.	.	.	.	.	.	.	.	.
TSHE-CLUN	90.	90.	10	67.	40.	3.	78.	58.	3.	78.	56.	3.	22.	9.	0.	.	.	.	.
ABLA-CLUN	22.	22.	9	99.	30.	1.	50.	20.	0.	50.	30.	1.	.	.	.	.	.	.	.
ABLA-XETE	80.	80.	10	88.	65.	5.	88.	58.	8.	99.	65.	2.	.	.	.	.	.	.	.
ABLA-ARCO	10.	10.	10	.	.	.	99.	40.	0.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	20.	20.	10	50.	10.	0.	50.	10.	0.	.	.	.	50.	10.	0.	.	.	.	.
FEID-AGCA	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	0.	0.	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Trifolium procumbens L.¹

Ranges are not given for hopclover in regional floras. We recorded it only in the Glacier area.

Altitudinally, this legume ranged from moist *Festuca scabrella* grasslands through moist *Tsuga-Tsuga-Abies* forests to somewhat drier *Abies-Xerophyllum* forests. Based on the distribution of other clovers, its absence from *Pseudotsuga* forests and higher *Abies* forest is probably due to lack of dispersal rather than narrow environmental tolerances. On the other hand, its absence from dry grasslands (BOGR-AGSP) and mountain meadow-alpine sites is probably environmental.

Trifolium thrives on roadsides, does almost as well in highly disturbed (roadcut) sites, was apparently absent from our lightly disturbed sites, and was rare on undisturbed sites.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. At infected roadsides *Trifolium* frequency was 11-75% and its cover was 0-6%. On roadcuts frequency was 7-43% and its cover was 0-2%. In undisturbed vegetation frequency was 0-10% and cover was 0%.

Table 70. Distribution of *Trifolium procumbens* L. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
	pc	sc	n	shoulder			ditch sl			road cut			cleared			n-climax		
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	0.	0.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AGSP-BOGR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FESC-FEID	70.	70.	10	86.	31.	0.	99.	77.	3.	57.	29.	0.	.	.	.	14.	9.	0.
ARWY-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARVA-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-SYAL	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-PHMA	0.	0.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POTR	99.	99.	8	88.	58.	3.	99.	75.	3.	75.	30.	1.	.	.	.	25.	10.	0.
THPL-OPHO	70.	70.	10	99.	37.	1.	43.	11.	1.	.	.	.	.	.	.	.	.	.
TSHE-CLUN	80.	80.	10	88.	73.	6.	88.	58.	5.	88.	28.	1.	.	.	.	.	.	.
ABLA-CLUN	78.	78.	9	99.	66.	3.	99.	33.	1.	71.	43.	2.	.	.	.	.	.	.
ABLA-XETE	90.	90.	10	78.	47.	1.	67.	22.	1.	33.	7.	0.	.	.	.	.	.	.
ABLA-ARCO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	0.	0.	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Trifolium repens L.¹

White clover is widespread in the northern Rocky Mountains (Wright and Booth 1959).

The legume ranges from moist grasslands (FESC-FEID and FEID-ARTE) through forests to mountain meadows. We did not find it at dry grassland (BOGR or AGSP) or alpine sites.

This *Trifolium* thrives on the road shoulder. Its absence from disturbed sites in grasslands, shrublands and low forests suggests that its roadside existence depends on runoff water. In the forest zone it performs reasonably well in low competition (roadcut) sites, but less well in higher competition (vegetation cleared) areas. The species is largely absent from undisturbed vegetation with a maximum of 30% constancy in one type (PSME-SYAL).

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. At roadsides its frequency is 0-84% and its cover is 0-13%. In disturbed areas frequency is 0-49% and cover is 0-3%. In near climax vegetation frequency is 0-20% and frequency is 0-20% and cover is 0-1%.

Table 71. Distribution of *Trifolium repens* L. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
	pc	sc	n	shoulder			ditch sl			road cut			cleared			n-climax		
				cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	0.	0.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AGSP-BOGR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FESC-FEID	20.	20.	10	50.	40.	0.	50.	10.	0.	.	.	.	.	.	.	.	.	.
ARWY-FEID	60.	60.	10	99.	53.	4.	67.	20.	1.	.	.	.	.	.	.	.	.	.
ARVA-FEID	40.	40.	10	25.	10.	1.	75.	15.	1.	.	.	.	.	.	.	.	.	.
PSME-SYAL	70.	80.	10	71.	54.	2.	71.	71.	4.	57.	49.	3.	50.	30.	1.	29.	20.	1.
PSME-PHMA	33.	67.	6	50.	50.	7.	99.	70.	6.	.	.	.	.	.	.	.	.	.
POTR	38.	38.	8	67.	13.	0.	33.	7.	0.	.	.	.	.	.	.	.	.	.
THPL-OPHO	99.	99.	10	99.	98.	13.	99.	84.	8.	.	.	.	.	.	.	.	.	.
TSHE-CLUN	99.	99.	10	90.	60.	5.	80.	64.	5.	80.	30.	1.	20.	12.	1.	.	.	.
ABLA-CLUN	89.	89.	9	88.	50.	2.	60.	28.	1.	50.	23.	0.	25.	5.	0.	.	.	.
ABLA-XETE	90.	90.	10	78.	40.	2.	78.	31.	2.	89.	24.	0.	25.	5.	1.	.	.	.
ABLA-ARCO	50.	50.	10	40.	12.	1.	99.	36.	1.	20.	8.	0.	.	.	.	.	.	.
ABLA-VASC	90.	90.	10	44.	31.	3.	89.	62.	9.	44.	18.	0.	11.	7.	0.	.	.	.
FEID-AGCA	30.	30.	10	67.	27.	1.	33.	7.	0.	33.	27.	1.	.	.	.	.	.	.
ALPINE	0.	0.	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Triticum aestivum L.¹

Wheat is widespread in the northern Rocky Mountains. It was found along roadsides north of Yellowstone.

This grass ranges from dry grasslands (BOGR-AGSP) probably through sagebrush communities to *Pseudotsuga* forests. We did not find it in moist forests, mountain meadows, or alpine sites.

Triticum appeared at roadsides, on roadcuts, and even occasionally in undisturbed BOGR grasslands.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. At roadsides frequency is 0-50% and cover is 0-5%. On disturbed sites frequency is 0-7% and cover is 0%. In undisturbed vegetation frequency and cover are both 0%.

Table 72. Distribution of *Triticum aestivum* L. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics														
				shoulder			ditch sl			road cut			cleared			n-climax		
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	57.57.	7		75.50.	0.		25. 5.	0.		25. 0.	0.					25. 0.	0.	
AGSP-BOGR	38.38.	8		99.33.	0.		.	.	.	.	.	.				.	.	.
FESC-FEID	0. 0.10			.	.	.	.	.	.	.	.	.				.	.	.
ARWY-FEID	0. 0.10			.	.	.	.	.	.	.	.	.				.	.	.
ARVA-FEID	0. 0.10			.	.	.	.	.	.	.	.	.				.	.	.
PSME-SYAL	20.30.10			50.30.	0.		99.30.	0.		.	.	.	.	.	.	.	.	.
PSME-PHMA	50.50. 6			99.20.	0.		.	.	.	33. 7.	0.		.	.	.	.	.	.
POTR	0. 0. 8			.	.	.	.	.	.	.	.	.				.	.	.
THPL-OPHO	0. 0.10			.	.	.	.	.	.							.	.	.
TSHE-CLUN	0. 0.10			.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-CLUN	0. 0. 9			.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	0. 0.10			.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	0. 0.10			.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	0. 0.10			.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0. 0.10			.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	0. 0.11			.	.	.	.	.	.	.	.	.				.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Verbascum thapsus L.¹

Since 1880, common mullein has spread to most of the northern Rocky Mountains (Forcella and Harvey 1981). We recorded it in all three parks. The plant is considered noxious in Washington and Oregon.

In our samples this scroph ranges intermittently from dry grasslands (AGSP) though dry (*Pseudotsuga*) and moist (*Thuja*- *Tsuga*) forest to cool *Abies* forest. We did not find it in the driest grasslands (BOGR), in sagebrush, in lower *Abies* forests, in mountain meadows or in the alpine. It seems likely to appear in both the *Artemisia* and in the *Abies* environmental types.

Verbascum usually does better on ditch slopes than road shoulders, perhaps because of its inflexible second year stalk. It commonly grows on roadcut and other low competition sites and may enter the vegetation of less disturbed (devegetated) and undisturbed sites.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. On roadsides at infected sites frequency is 0-63% and cover is 0-2%. On disturbed sites frequency is 0-20% and cover is 0-1%. In undisturbed vegetation frequency and cover are both 0%.

Table 73. Distribution of *Verbascum thapsus* L. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.	Zonal statistics														
		shoulder			ditch sl			road cut			cleared			n-climax		
	pc sc n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	0.43. 7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AGSP-BOGR	13.25. 8	.	.	.	99.20.	0.	.	.	.	.	.	.	.	99. 0.	0.	.
FESC-FEID	30.30.10	.	.	.	67.33.	0.	67.20.	0.	.	.	.	.	.	.	.	.
ARWY-FEID	0. 0.10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARVA-FEID	0. 0.10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-SYAL	10.20.10	.	.	.	99.40.	0.	.	.	.	.	.	.	.	.	.	.
PSME-PHMA	33.67. 6	.	.	.	50. 0.	0.	99.20.	1.	99.20.	0.	.	.	.	.	.	.
POTR	25.25. 8	.	.	.	50.20.	1.	50.10.	0.	.	.	.	.	.	.	.	.
THPL-OPHO	10.10.10	.	.	.	99.20.	0.	.	.	.	.	.	.	.	.	.	.
TSHE-CLUN	70.70.10	86.63.	2.	71.17.	0.	.	.	.	.	.	.	.	.	.	.	.
ABLA-CLUN	0. 0. 9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	0. 0.10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	0. 0.10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	10.10.10	99.20.	0.	.	.	.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0. 0.10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	0. 0.11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Veronica officinalis L.¹

Common speedwell grows in the forests of the Cascades as well as the wet forest of Glacier. Its spread in the northern Rocky Mountains may be limited by the lack of suitably wet sites.

This scroph appears in wet forests (Thuja-Tsuga) and may not be able to extend upward or downward altitudinally.

Veronica appears at roadsides and may be unable to invade zones with more competition.

The species dominance of a site at an infected locale is indicated by its dispersion (frequency= probability of occurrence in a 1x5 m quadrat) and cover. At roadsides *Veronica* had a frequency of 0-80% and a cover of 0-2%. It was not found on disturbed or undisturbed sites.

Table 74. Distribution of *Veronica officinalis* L. by environmental zone (HT) and disturbance condition (DC). Zonal data are based on infected sites only.

Habitat	Site st.			Zonal statistics															
				shoulder			ditch sl			road cut			cleared			n-climax			
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	
BOGR-STCO	0.	0.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AGSP-BOGR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FESC-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARWY-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ARVA-FEID	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-SYAL	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
PSME-PHMA	0.	0.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
POTR	0.	0.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
THPL-OPHO	30.	30.	10	33.	13.	0.	67.	33.	2.	.	.	.	.	.	.	.	.	.	.
TSHE-CLUN	10.	10.	10	99.	80.	0.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-CLUN	0.	0.	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-XETE	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-ARCO	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ABLA-VASC	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FEID-AGCA	0.	0.	10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ALPINE	0.	0.	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

¹ The use of the following paragraphs and table are discussed both in the introduction and in Table 75.

Table 75. Interpretation of single species presentations.

Paragraph one gives the common name, gives the regional distribution, and tells whether the plant is considered noxious in regional law.

Paragraph two indicates its family (by common name), and environmental (altitudinal) range.

Paragraph three gives the plant's presence in disturbance zones including constantly disturbed, regularly disturbed, once drastically disturbed (primary succession), once devegetated (secondary succession) and undisturbed.

Paragraph four summarizes the species tendency to dominate in each cell of the environmental type (HT)-disturbance condition (DC) matrix.

The table presents data supporting the statements made above. The footnotes which follow the abbreviated table below can be applied to each of the preceding tables:

Table XX. Distribution of *Phleum pratense* L. by habitat and disturbance type.

Habitat ¹	Site st. ²			Zonal statistics ³														
				shoulder			ditch sl			road cut			cleared			n-climax		
	pc	sc	n	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv	cn	fq	cv
BOGR-STCO	14.14.	7	99.40.	0.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

1 Habitat types are listed in order of altitude: two dry grasslands (BOGR and AGSP), three moist grasslands (FEID), two warm dry forests (PSME), four warm moist forests (POTR, THPL, TSHE, and ABLA-CLUN), three cool forests (ABLA), mountain meadows (FEID-AGCA) and alpine.

2 Site statistics give the number (n) of sites studied in the habitat type and the percentage infection rate. Plot constancy (pc) gives the percent of the sites in which the exotic was found in any of the five 1x25 m zonal (shoulder through n-climax) quadrats. Site constancy (sc) gives the percentage of the sites in which the species is found anywhere at the site--even outside the plots. Site constancy (sc) is therefore similar to, but slightly larger than, plot constancy (pc).

3 The zonal statistics describe the presence of the exotic in five disturbance zones of infected sites. The disturbance zones are road-shoulder (polluted, watered, and trampled), ditch slope (polluted, watered, often mowed, and sometimes herbicide-ed), road cut (bared to mineral soil, but little disturbed since, ie primary succession), cleared (vegetation removed, but soil intact, ie secondary succession), and near-climax. Three measures of presence at infected sites are used in each zone. Constancy (cn) measures universality of presence across sites; it is the percentage of 1 x 25m plots in the zone and at infected sites which are infected. Frequency measures ubiquity of infection; it is the percentage of 1 x 5m subplots in the zone and at infected sites which are infected. Cover (cv) measures the tendency of the exotic to dominate the site; it is the average cover of the exotic in all 1 x 25m plots in the zone at infected sites.

INDEX

The preceding seventy-three pages contain descriptions of the noxiousness, geographic range, altitudinal range, disturbance requirement, and capacity to dominate for seventy-two exotics found in the Glacier, Yellowstone, and Grand Teton National Park areas.

No index is required for individuals seeking information on a species known by its scientific name: the species accounts are presented alphabetically. (See Table 2 for an alphabetical list of scientific names.)

The common names of the exotic species studied are listed below in alphabetical order with their scientific names and the authorities for those names. To locate information on a species known only by its common name, locate its common name in the following list, determine its proper scientific name, and use it to locate the description in the alphabetically ordered pages.

alfalfa	Medicago sativa L
alyssum, pale	Alyssum alyssoides L
alyssum, hoary false	Berteroa incana (L)DC
bindweed, field	Convolvulus arvensis L
bluegrass, canada	Poa compressa L
bluegrass, kentucky	Poa pratensis L
bristlegrass, green	Setaria viridis (L)Beauv
brome, downy	Bromus tectorum L
brome, smooth	Bromus inermis Leys
campion, white	Lychnis alba L
canadian thistle	Cirsium arvense (L)Scop
canary-grass, reed	Phalaris arundinacea L
charlock	Brassica kaber (DC)Wheeler
chess, downy	Bromus tectorum L.
chess, japanese	Bromus japonicus Thunb
chickweed, big	Cerastium vulgatum L
clover, procumbent	Trifolium procumbens. L
clover, red	Trifolium pratense L
clover, alsake	Trifolium hybridum L.
clover, white	Trifolium repens L.
clover, hop	Trifolium agrarium L.
cockle, white	Lychnis alba L
daisy, oxeye	Chrysanthemum leucanthemum L.
dandelion	Taraxacum officinale Weber.
dock, curl	Rumex crispus L
falseflax, littlepod	Camelina microcarpa (L) Andr
fanweed	Thlaspi arvense L.
fescue, meadow	Festuca pratensis Huds.
fescue, reed or alta	Festuca arundinacea Scrb
fescue, red	Festuca rubra L.
foxtail, meadow	Alopecurus pratensis L
gumweed, curlcup	Grindelia squarrosa (Pursh)Dunal
hound's tongue	Cynoglossum officinale L
knapweed, spotted	Centaurea maculosa Lam
knotweed	Polygonum achoreum Blake
knotweed, prostrate	Polygonum aviculare L

kochia
 lamb's quarter
 lettuce, yellow
 medic, black
 mullein, flannel
 oatgrass, oatgrass
 oats, cultivated
 orchard grass
 pepperweed, field
 pineapple weed
 plantain, broadleaf
 plantain, buckhorn
 quackgrass
 redtop
 rockcress, tower
 russian thistle
 sagewort, common
 salsify, common
 selfheal, common
 shepard's purse
 silene, bladder
 sorrel, sheep
 speedwell
 spurry, red
 St John's-wort, common
 stick-tight, european
 summer cypress
 sweetclover, yellow
 sweetclover, white
 tansy, common
 tansymustard, pinnate
 tarweed, cluster
 thistle, bull
 thistle, canada
 timothy
 toadflax, butter-and-eggs
 toad-flax, damlatian
 tumbledmustard
 tumbledmustard, small pod
 wheat
 wheatgrass, crested
 wheatgrass, intermediate

Kochia scoparia (L) Schrad.
 Chenopodium album L
 Lactuca serriola L
 Medicago lupulina. L
 Verbascum thapsus L
 Arrhenatherum elatius (L)Presl
 Avena sativa L
 Dactylis glomerata L
 Lepidium campestre (L)R Br
 Matricaria matricarioides (Less)Port
 Plantago major L.
 Plantago lanceolata L.
 Agropyron repens (L)Beauv
 Agrostis alba L
 Arabis glabra (L) Bernh
 Salsola kali L
 Artemisia absinthium L.
 Tragopogon dubius Scop
 Prunella vulgaris L
 Capsella bursa-pastoris (L)Medic
 Silene vulgaris (Moench)Garcke
 Rumex acetosella L
 Veronica officinalis L
 Spergularia rubra (L)J&C
 Hypericum perforatum L
 Lappula floribunda (Lehm) Johnst
 Kochia scoparia (L.)Schrad.
 Melilotus officinalis (L) Lam.
 Melilotus alba Desr
 Tanacetum vulgare L
 Descurainia pinnata (Walt)Britt
 Madia glomerata Hook
 Cirsium vulgare (Savi)Tenore
 Cirsium arvense (L)Scop
 Phleum pratense L
 Linaria vulgaris Hill
 Linaria dalmatica (L) Mill
 Sisymbrium altissimum L.
 Sisymbrium loeselii L.
 Triticum aestivum L.
 Agropyron cristatum (L)Gaertn.
 Agropyron intermedium (Host)Beauv