7-1956

The Problem of St. Johnswort: A Noxious Plant in Western Montana

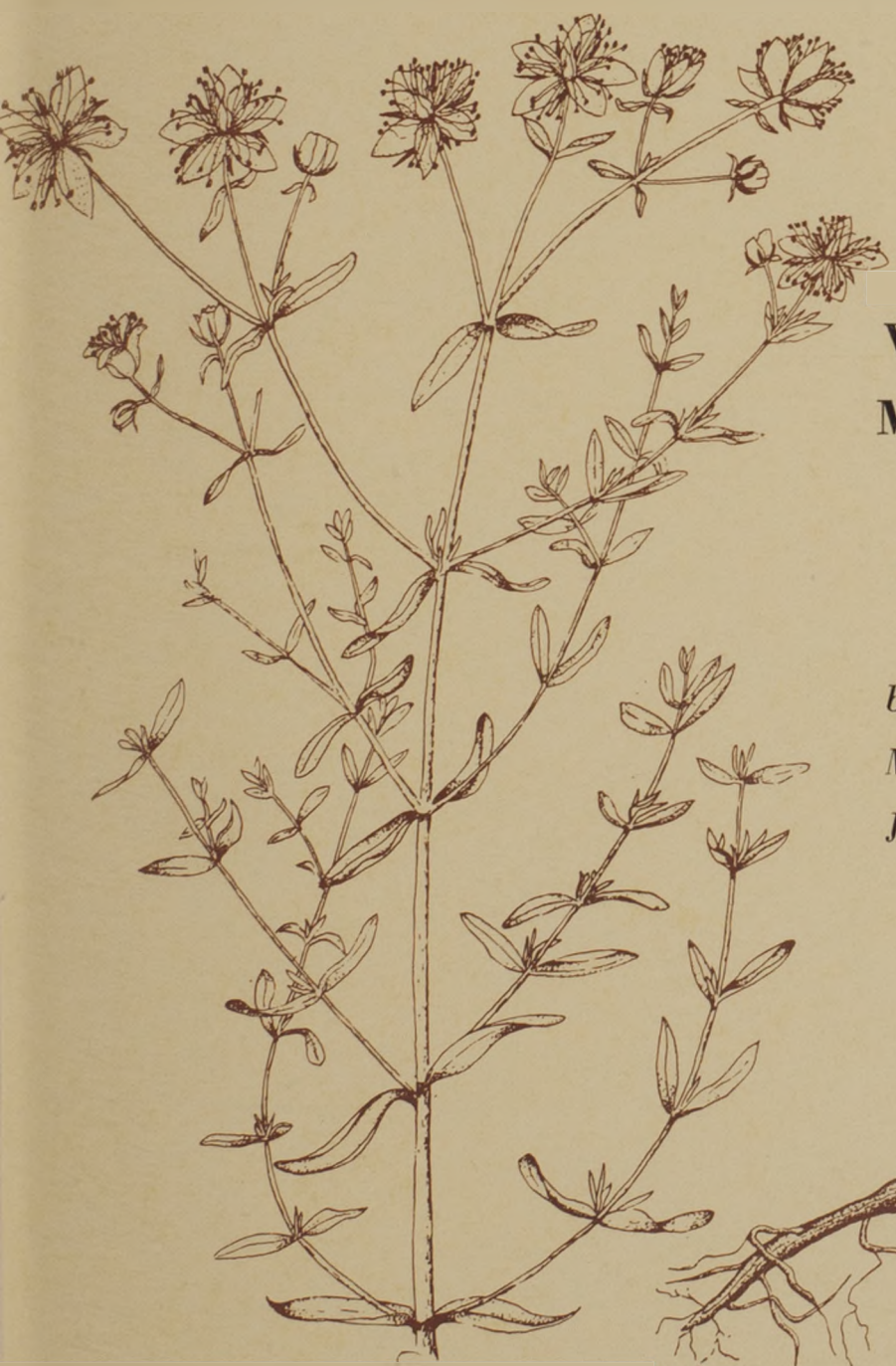
Melvin Morris
Montana Forest and Conservation Experiment Station

Joseph Meuchel
Montana Forest and Conservation Experiment Station

Bulletin 4
July, 1956

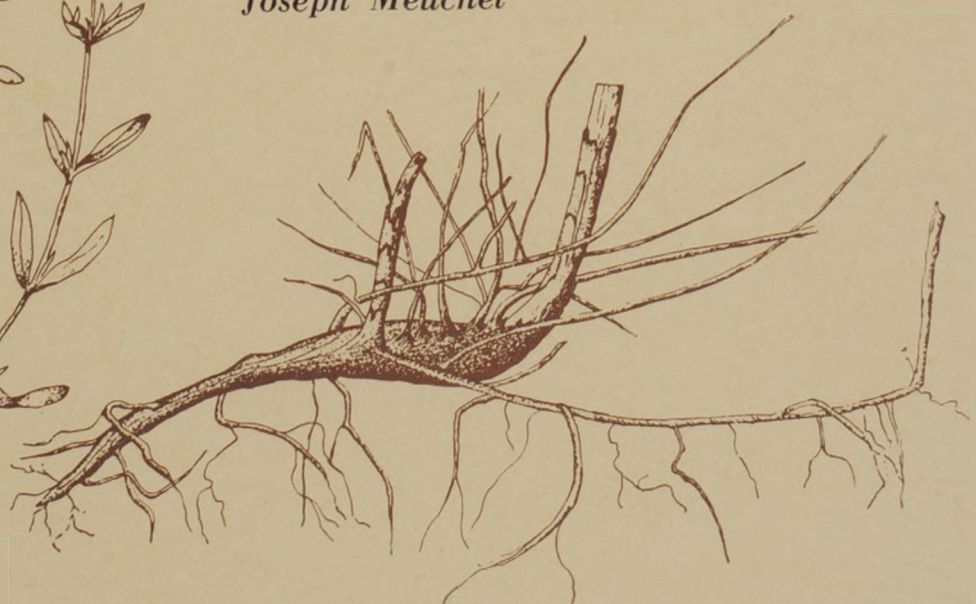
The Problem of St. Johnswort

A NOXIOUS PLANT



IN WESTERN MONTANA

by
Melvin Morris
Joseph Meuchel



MONTANA FOREST AND CONSERVATION EXPERIMENT STATION

SCHOOL OF FORESTRY
Montana State University
Missoula, Montana

The Problem of St. Johnswort

A NOXIOUS PLANT*

IN WESTERN MONTANA

Melvin S. Morris and Joseph Meuchel

The invasion of the state by many undesirable plants has been an inevitable consequence of settlement and use of land. Cheatgrass brome, leafy spurge, whitetop, Canadian thistle, and a host of other plants have invaded agricultural and range lands. A relatively recent addition is St. Johnswort, *Hypericum perforatum* L., sometimes called goatweed or Klamath weed. This undesirable plant, a native of western Europe, has spread around the world and is now considered a pest in Australia, New Zealand, South Africa and western United States.

This weed, in common with many others, is capable of invading cropland, grassland, and open forestland. Idle cropland, overused range, and disturbed sites along roads are points of invasion. Since the plant is very aggressive, it suppresses other vegetation present. While the plant may be poisonous to livestock, the main objection to it is that it reduces the growth of grass and other forage plants on the range. Nearly pure stands of this weed can develop over extensive areas from a beginning made by a few plants. It seems desirable that people should become familiar with the plant and take the necessary steps to bring it under control and to prevent the further spread of the species.

BOTANICAL CHARACTERISTICS OF THE PLANT

St. Johnswort can be readily recognized by means of several characteristics. When in bloom the flowers are many with five bright yellow petals on each flower. The flower is approximately one-half to three-fourths inch across. Black glandular dots are found along the border of each petal. The more or less oblong shaped leaves are paired along the stem. Scattered pinhole-like glands can be readily seen when the leaf is held to the light. Black glandular spots can be found along the inrolled edge of the underside of the leaf. The fruit is a dry three-chambered capsule. The root crown has many laterally spreading branches. The plant is capable of spreading by these lateral rootstocks as well as by seed. When growing in open ground an individual plant will produce several stems from 15 to 25 inches in height. See Figure 1.

SITE CONDITIONS

In western Montana, St. Johnswort grows well on a wide variety of sites. The most common site is along highways. It may be seen along U. S. 10, from just below the summit of Lookout Pass to Alberton in Mineral County. In Missoula County it is found growing along the Big Blackfoot highway. It may be expected anywhere along roads in western Montana. In Sanders County, scattered stands are found under ponderosa pine, Douglas fir and some open larch timber. The heaviest stands are on heavily logged-off lands and clearings in Sanders County. Other large stands are located in open grassland in Lake and Missoula Counties. In Ravalli County dense stands are found in abandoned apple orchards near Charlos Heights. In Meagher County, St. Johnswort is found growing in sagebrush along the right-of-way of the Milwaukee Railroad. Scattered plants have been found on wet springy ground and on shallow gravelly soil in the Blackfoot Valley in Missoula County. The plant will grow in the shade or in the open. It appears to do better on sunny sites and develop denser in the open. From the above described situations, it can be seen that this plant will grow under a wide variety of conditions in western Montana.

*This study was financed by a grant from the University Research Committee.

FIG. 1. Distinctive features of St. Johnswort. Five yellow petals, leaves in pairs and oblong shaped. Black glandular spots on flower and leaf. Fruit a three-celled capsule. Root crown with horizontal branches. Redrawn from Range Plant Handbook.

THE ABUNDANCE AND LOCATION OF ST. JOHNSWORT IN MONTANA

The original purpose of this study was to determine the abundance and location of this undesirable plant in the state and to evaluate the problem of its control. Available records of the United States Forest Service and information from other sources were secured to aid in making a survey of the plant's occurrence. Nearly all known stands were visited and adjacent areas were explored for possible extension of the reported stands. Many county and other access roads were traveled and adjoining lands were examined for occurrence of the plant. The field examination was made in the fall of 1955. St. Johnswort can be readily recognized in the fall by its distinctive reddish brown color and upright habit of growth. All recognizable individual plants, scattered clumps, or extensive stands were examined on foot and when necessary the size of the stand was paced out. It is expected that some stands exist that were not found by this method. Figure 2 shows the generalized distribution of the plant in the state. The principal infestation is in Sanders County. Other counties having large stands are Mineral, Lake, Ravalli, and Missoula. The easternmost distribution is found northeast of Bozeman, west of Ringling, and south of Wolf Creek. At one time a small stand was located in the Castle Mountains south of White Sulphur Springs. This stand has been eradicated by the United States Forest Service.

Table 1 lists the stands found in the state. It gives the location, size of stand, ownership of land, and other significant information. It can be seen that the plant may exist in extensive stands as in western Sanders County where it has been estimated that some 200,000 acres are involved, or it may occur as scattered plants as in western Powell County. This should not be taken to imply that a solid stand of this size exists in Sanders County, but that it may be found occurring over that acreage from small patches and scattered plants to stands as large as a quarter section in size. The following summarizes the data in Table 1.

County	Acres
Sanders	200,230
Mineral	7,226
Lake	2,210
Ravalli	1,200
Missoula	291
Flathead	62
Lincoln	10
Meagher	1*
Powell	1*
Gallatin	1*
Lewis and Clark	1*
*or less	211,233

The survey is important for several reasons. It exists as a record of the present known stands. Future surveys will permit evaluation of the aggressiveness of the species. Information on present sites permits some prediction of possible extent of spread to similar sites not now infested. It can serve to call the problem to the attention of various owners involved. It may provide a basis for concerted action in the control of the pest. An informed public is a desirable step toward control.

Figure 3 is a map containing the possible limits of spread based on present knowledge of the growth requirements of the plant. If the plant is uncontrolled it is conceivable that it may in the future, occupy an area of some 20,000,000 acres except for the enclosed tillable land where annual cropping is adequate for control. The rate of movement is unpredictable. However, the rate at which it has been increasing in the lower Blackfoot Valley in recent years is indicative of its rate of spread. In 1950, it was estimated that there was only one acre of this plant in Missoula County. At present at least 290 acres are infested. Previous to 1945 no plants were visible along State Highway 20 from Bonner to Clearwater Crossing. At present it is not difficult to find it all along this section of highway.

POSSIBILITIES OF CONTROL

Several methods of control have been used at various times and in different places. On cropland, ordinary tillage in connection with cropping will keep the plant in check. On

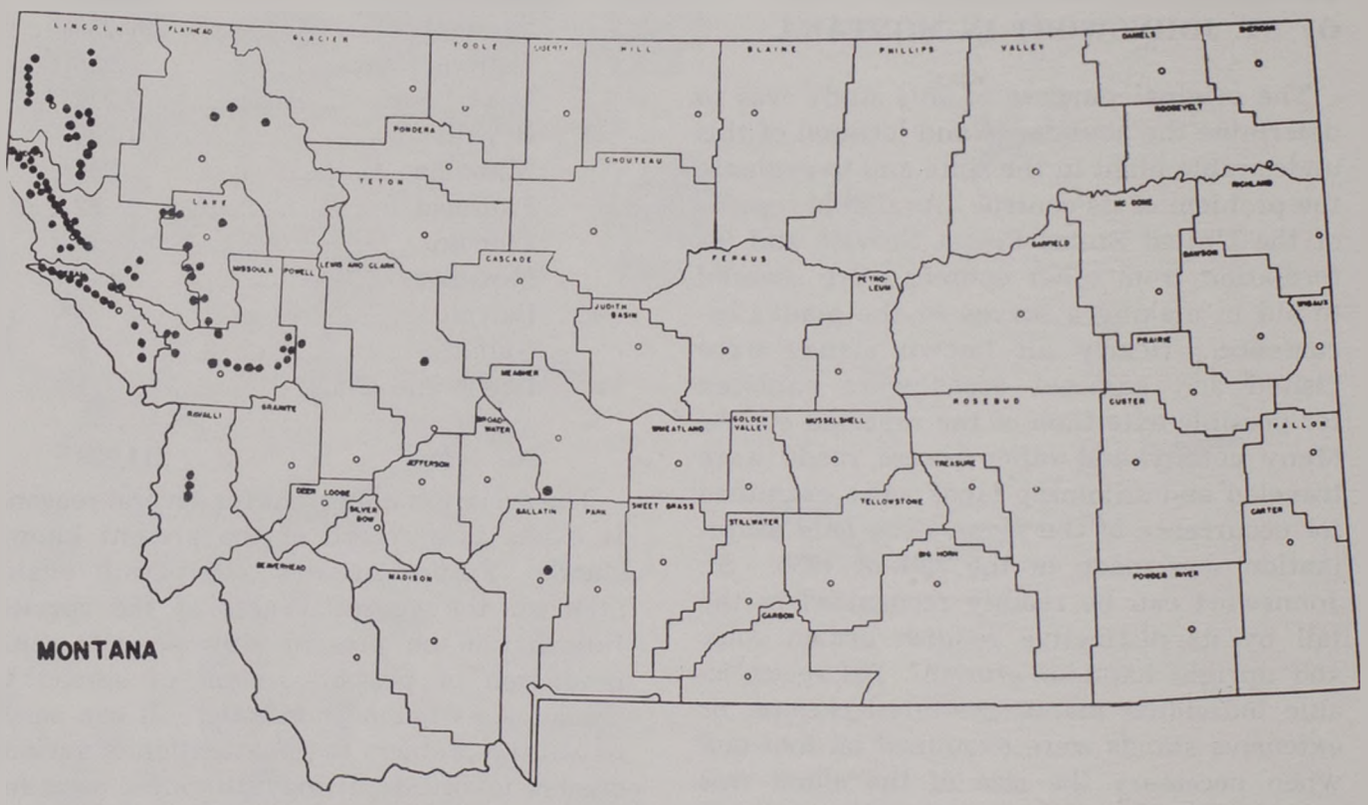


FIG. 2. Generalized distribution map of existing stands of St. Johnswort in Montana, Fall of 1955.

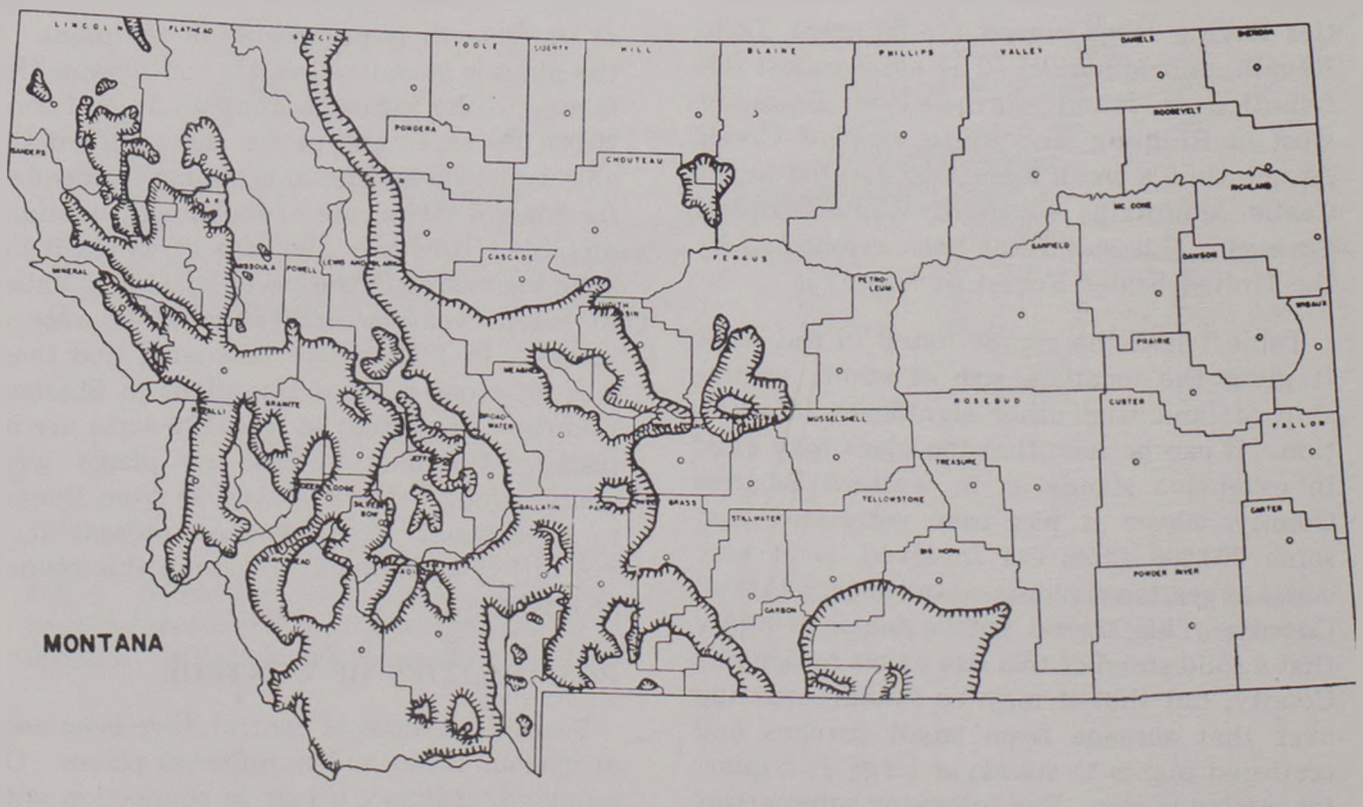


FIG. 3. Potential area which may be invaded by St. Johnswort.

TABLE I. Location and general characteristics of St. Johnswort infestation areas.

LOCATION	TYPE OF STAND	SIZE	OWNERSHIP*	SITE
		SANDERS COUNTY		
Highway 10A, 4 mi. west of Perma	Scattered patches and single plants	1/10 acre	State, private	Grass, weed
Highway 10A, 2 mi. east of Paradise	Scattered plants	500 sq. ft.	State, R.R.	Roadside grass
Highway 10A, 5 mi. west of Paradise	3 single plants	50 sq. ft.	State	Roadside weeds, grass, brush
Highway 10A, 4 mi. west of Plains to Thompson River	Scattered plants	30 acres	State, private	Roadside grass, pine, grassland, brush
Sanders County from Thompson River to Idaho Line	Extensive stands and scattered patches	200,000 acres	Private, state, federal, R.R.	Open grassland to heavy timber
St. Regis-Paradise cut-off road. Quinn Hot Springs	2 small patches		Private	Good pine, grassland
St. Regis-Paradise cut-off road, south of ferry	Scattered stands and single plants	200 acres	County, private R.R.	Open pine, grasland, and brush
Junction State Highway 28 and U.S. 10A	1 small patch	150 sq. ft.	State	Roadside grass, weeds
State Highway 28, 7 mi. north of Plains	Isolated patch	200 sq. ft.	State	Pine, grass, brush
		MINERAL COUNTY		
U.S. 10 W of Alberton Tarkio to 4½ mi. east	Scattered stands and single plants	1,200 acres	State, private	Roadside, grassland, open pine
U.S. 10 6 mi. west of Superior	Scattered patches and single plants	10 acres	State, R.R.	Roadside, weeds, grass
South side road, 3 mi. east of Diamond Match Mill	Scattered patches and single plants	16 acres	Private, R.R.	Open pine, grassland, brush
Paradise-St. Regis cutoff road. St. Regis end	Single plants		County, private	Open pine, roadside grass, weeds
U. S. 10. St. Regis west to Idaho line	Extensive stands and scattered patches	6,000 acres	State, private federal and R.R.	Roadside grass, weeds
Hole-in-Wall Ranch, Fish Creek	Patch	500 sq. ft.	Private	Bluegrass and snowberry

*Ownership may not be correctly established.

TABLE I. Location and general characteristics of St. Johnswort infestation areas (continued).

LOCATION	TYPE OF STAND	SIZE	OWNERSHIP*	SITE
		LAKE COUNTY		
Bison Range	Dense to scattered	700 acres	Federal	Mainly open grassland
Dixon-Moiese, 1 mi. north of Agency	Scattered	100 sq. ft.	County	Bluegrass, yarrow, knapweed
13 mi. north of Agency	Dense to scattered	500 acres	Private	Cheatgrass, sagewort
Sec. 6, T19N, R21W	Single plants		Private	Bluegrass, yarrow, knapweed
16 mi. north of Agency on river	Scattered	10 acres	Private	Bluegrass, wheatgrass, cheatgrass
8/10 mi. north of Sloan Crossing	Scattered and dense small stand	1/10 acre	Private, county	Cheatgrass, snowberry, rabbitbrush
South of Sloan Crossing	Scattered to dense	1,000 acres	Private	Bluegrass, cheatgrass, fringed sage, junegrass
2 mi. north of Arlee west of highway	Single clump		State	Kentucky bluegrass, yarrow, knapweed
5 mi. north of Evaro, east of highway	Single clump		State	Fir, larch, forest shrubs
		MISSOULA COUNTY		
U.S. 10 2 mi. west of Missoula near King's Inn	Scattered stand	10 acres	Private	Open grass, weeds
Ninemile Cr., west of Missoula	Scattered clumps	10 acres	Private, federal	Pine, grassland
U.S. 10, mouth of Petty Cr.	Isolated stand	1 acre	Private, county	Pine, grassland, brush
U.S. 93, Evaro Hill	Isolated clump	100 sq. ft.	State	Roadside grass, weeds, brush
Rattlesnake Creek, north of Missoula	Scattered stands and single plants	30 acres	Private	Pine, larch, grass, brush
State 20, from Bonner to Cottonwood Cr.	Scattered stands and small clumps		State, private	Roadside grass, brush, pine, fir
Diamond Mountain Road	Dense stand and scattered plants	30 acres	Private	Pine, grassland
Blanchard Creek Road	Scattered stands and single plants	10 acres	Private, state	Pine, grassland, flats
Seeley Lake Road Blanchard Flat	Scattered stands and single plants	200 acres	State	Good grassland, and roadside

TABLE I. Location and general characteristics of St. Johnswort infestation areas (continued).

LOCATION	TYPE OF STAND	SIZE	OWNERSHIP*	SITE
		LINCOLN COUNTY		
U.S. 2, Swamp Creek to Idaho line with main concentration around Troy	Scattered stands and isolated clumps	10 acres	State, private federal	Pine, grass, brush
Fisher River, Sedlak Park to Kootenai River	Scattered stands and clumps		State, private, federal	Pine, grass, brush
Kootenai River from confluence of Fisher River to Libby	Scattered stands & clumps		County, private, federal	Pine, grass, brush
Rexford-Libby Road Big Creek South	Isolated clumps		County, private federal	Pine, grass, brush
Yaak River, 3 mi. south of Sylvanite R.S.	Isolated stand		Private	Pine, grass, brush
		FLATHEAD COUNTY		
Lake Five	Scattered stand	60 acres	Private	Bluegrass, weeds, open pine
Big Creek Road, 1 mi. northeast, Columbia Falls	Dense patches	2 acres	County, R.R.	
Big Creek Road, 2 mi. northeast, Columbia Falls	Scattered plants	200 sq. ft.	County	Alder, other shrubs
U.S. 2, 7 mi. west of Essex	Patch		State	Roadside grass and brush
		RAVALLI COUNTY		
Foothill southwest of Hamilton, Sawtooth to Lost Horse, adj. to forest bwdy.	Scattered stands	1,200 acres	Private, federal	Pine, grassland, orchard
		GALLATIN COUNTY		
North of Fort Ellis	Scattered stand	1 acre or less	Private	Grass, brush
		POWELL COUNTY		
Along Sperry Grade	Scattered plants	1 acre or less	State, county	Open roadside and grassland
		MEAGHER COUNTY		
6½ mi. west of Ringling along R.R.	Scattered plants	1 acre or less	R. R., private	Bunch wheatgrass, junegrass, sagebrush
		LEWIS AND CLARK COUNTY		
Along side of highway 9 mi. south of Wolf Creek	Scattered plants		State	Bunchgrass, barrow pit

pasture and forest land the method of control will vary with the size of stand and the associated vegetation.

In northern California and northern Idaho satisfactory control has been obtained by using an introduced beetle which feeds only on St. Johnswort. A root borer is currently being tried for sites where the beetle is not effective. Beetles have been tried in Montana since 1949, but it may be too early to predict what they will do here. At present the only significant kill of the weed has been on one open slope in Sanders County and on a stand growing in the open in Lake County. As yet no successful control has been found where beetles have been used in forested areas in this state. The reliance on beetles or other natural controls does not appear to warrant delay in control by using other methods on small stands or isolated plants in this state.

Large stands in Lake County have been controlled by the use of 2, 4-D sprays, using two pounds or more of acid equivalent per acre, applied in early summer when plants are growing vigorously. While the costs of this method may be justified for stands of this weed in special areas, it may be too costly for some land owners with large acreages infested. In any case, the use of 2, 4-D seems desirable on small stands or scattered patches or along highways or railroads. One of the problems of control by the use of beetles and hormone sprays is the reestablishment of stands from buried seed. Retreatment will probably be necesary in most cases when 2, 4-D is used.

Borax is an effective control material when applied at the rate of eight pounds per square rod. Borax is a soil sterilant and will not only kill the weed but also associated vegetation. It will also kill the seeds of the weed and thus prevent emergence of new stands. Cost, the difficulty and general undesirability of treating large stands by this method, will limit its use. It is suggested that borax should be used on small patches and on isolated plants to insure that all the roots will be killed and the seed destroyed. All such stands should be marked and revisited to insure that no plants escaped treatment.

SOME GENERAL PRINCIPLES

In general, undesirable plants seldom invade well established, thrifty stands of natural vegetation. Thus good range management is a requirement to prevent invasion of range by undesirable plants. Good management should follow any control measures taken.

Small stands can be more effectively and more economically treated for control by direct methods such as sprays or soil sterilants than to wait until infestations are extensive and then depend on natural controls or biological controls. Depleted ranges or disturbed soils cannot be stabilized by permanent cover in a short time. As to biological controls, it is not fully known that they will work every place or under all kinds of site conditions.

The time for control is in the present, not in the future. Community action is always preferred to individual action. A pest such as St. Johnswort may be found in one area today, but if left untreated, it may be on someone else's land tomorrow.

SELECTED REFERENCES

Sampson, A. W. and K. W. Parker. 1930. St. Johnswort on the range lands of California. California Agric. Exp. Sta. Bull. 503.

Holloway, J. K. and C. B. Huffaker. 1951. The role of *Chrysolina gemellata* in the biological control of Klamath weed. Jour. Econ. Ent. 44:244-247.

Roemhild, George. 1956. Status of the Chrysolina beetle project, Jan. 1, 1956. Conference on goatweed and other range weeds, University of Idaho, March 7 and 8, 1956. Montana State College, Bozeman, Mont. Multilithed.

Nelson, Howard S. 1955. The phenology of goatweed, *Hypericum perforatum*, in relation to the behavior of goatweed beetles, *Chrysolina gemellata* and *C. hyperici* in western Montana. Univ. of Montana, School of Forestry. Master's thesis.