THE RETURN OF THE NATIVE? *SIDALCEA HIRTIPES* IN COASTAL OREGON

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Abstract: Hairy-stemmed checkermallow (*Sidalcea hirtipes*) is a rare, indigenous plant found only in Oregon and Washington. *Sidalcea hirtipes* appeared in a corner of an abandoned pasture on the Oregon coast after the successful biological control of the non-indigenous weed, tansy ragwort (*Senecio jacobaea*). Population studies are difficult because *S. hirtipes* is a sexually dimorphic, rhizomatous, perennial plant. The patchy distribution of vegetatively spreading clones makes it difficult to distinguish individual plants. In a two-year study, the area of one patch increased by 42.9 percent. *Sidalcea hirtipes* in general appears to be increasing the size of its population since the decline of *Senecio jacobaea* at the abandoned pasture, perhaps because of control of the exotic weed.

Key words: *Sidalcea hirtipes*, *Senecio jacobaea*, native, recovery, restoration, introduced species

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INTRODUCTION

Site History

In 1980, an abandoned pasture in the Cascade Head Scenic Research Area on the central Oregon coast was almost a monoculture of tansy ragwort (*Senecio jacobaea*), having been grazed by dairy cattle until 1977. In 1983, a successful biological control effort reduced tansy ragwort abundance with the combined introduction of three phytophagous insects: ragwort flea beetle (*Longitarsus jacobaeae*), cinnabar moth (*Tyria jacobaeae*), and ragwort seedfly (*Botanophila seneciella*). The larvae of the cinnabar moth eat the leaves and flowering heads of the plants. The adults of the flea beetle make holes in the leaves of seedlings and rosettes while the larvae tunnel in the leaves, petioles, stems and roots. The ragwort seedfly larvae consume immature seeds and the base of the involucre (McEvoy *et al*, 1991). After the dramatic decline of tansy ragwort, perennial grasses became the dominant plant species in the pasture and patches of *Sidalcea hirtipes* were noticed in one area. General observations that *S. hirtipes*, a rare native plant, was increasing and spreading in the meadow since the decline of tansy ragwort prompted this research.

PLANT DESCRIPTION AND STUDY AREA

Sidalcea hirtipes (hairy-stemmed checkermallow) of the Malvaceae family is an indigenous perennial plant species with distinctive showy pink flowers in the summer. *Sidalcea hirtipes* has been collected in Oregon and Washington and misidentified as *S. spicata*, *S. examina*, *S. hendersonii*, *S. campestris*, *S. oregana*, and *S. malvaeflora* until C.L. Hitchcock described *S. hirtipes* in 1957 (Hitchcock, 1957) as a distinct species. *Sidalcea hirtipes* has a heavy taproot and well developed rhizomes. Plant stems are 7 to 13 dm tall with densely long stiff pubescence. Each inflorescence is congested and spike-like. The calyx is enlarged considerably in fruit and hirsute with stellate as well as many short hairs. The carpels

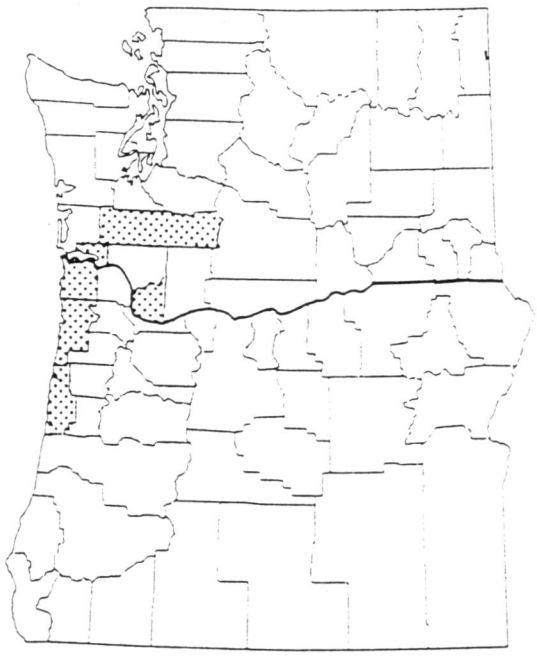

FIG. 1. Geographical distribution of *Sidalcea hirtipes* in Oregon and Washington.

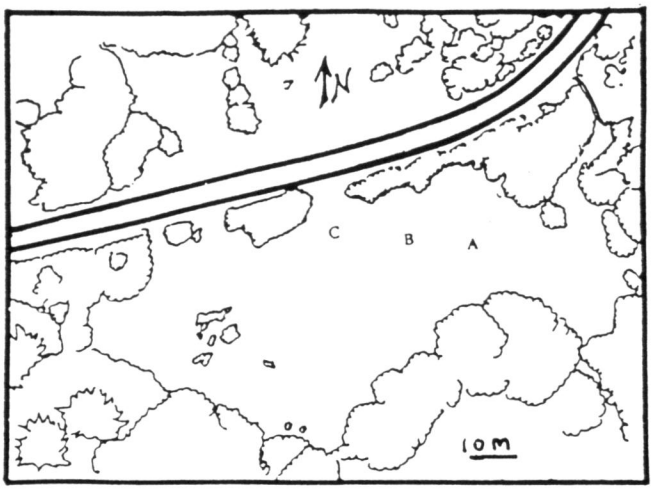

FIG. 2. Pasture study site at Three Rocks Road with Patches A, B and C.

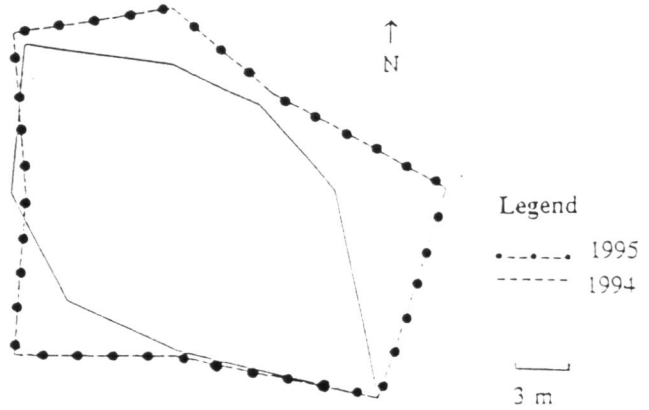

FIG. 3. Map of Patch A showing area covered in 1994 and 1995.

are very markedly roughened (Hitchcock, 1957). There is variation in the size of the flowers of all the *Sidalcea* species, partially as a result of ecological conditions but primarily due to the fact that they are dimorphic. Perfect-flowered plants occur in all *Sidalcea* species usually with other plants being strictly pistillate. However, all plants appear to have functional pistils and normally set fruits (Hitchcock, 1957). A recent examination of specimens in the OSU herbarium with Dr. Aaron Liston (Dept. Botany, OSU) appears to confirm a gynodioecious breeding system in *S. hirtipes*. There has been no change in Hitchcock's 1957 treatment of this species.

Sidalcea hirtipes is a regional endemic with populations declining in Washington, and limited in Oregon (Figure 1). The few populations in Washington occur in Wahkiakum, Clark and Lewis counties. In Oregon, *S. hirtipes* occurs in Tillamook and Clatsop counties, and northern Lincoln County. The habitat for *S. hirtipes* in Oregon includes coastal bluffs and grassland communities to coastal mountains, but not on tideflats (Hitchcock *et al.*, 1961). This species is considered by the Oregon Natural Heritage Program (ONHP) to be threatened or endangered throughout its range, and it is a candidate for endangered listing by the Oregon Department of Agriculture (ONHP, 1995). The historical site records and the current distribution need to be verified to assess the overall range of the population today. *Sidalcea hirtipes* at the study site was first vouchered in 1985 (Gruber *s.n.*, collection housed at OSC).

The site of this study is an abandoned pasture on Three Rocks Road (Figure 2) in the Siuslaw National Forest and lies on the border of Lincoln and Tillamook counties. The site has warm dry summers and cool wet winters. The daily mean temperatures rarely fall below freezing. The mean annual rainfall is 252 cm, with 69 percent falling from November through March. The mean monthly temperature ranges between 5.1°C in January and 15.7 °C in August, based on normals for the period 1951-1980 (McEvoy *et al*, 1993). Strong ocean winds occur in this area. Drought conditions do not occur, though most of the precipitation is in the winter, because summer fog provides moisture through condensation on tree crowns and vegetation (Franklin, 1972).

The grassland plant communities that *Sidalcea hirtipes* is associated with have little or no shade. The coastal bluffs in Oregon have historical backgrounds of fires which maintained the open grassy slopes. This dynamic would be similar to the frequent fires in the Willamette Valley prairies which reduced the abundance of shrubs and trees, and promoted a rich diversity of native forbs (Wilson *et al.*, 1995). Other natural disturbances that may help maintain open areas are grazing by deer and elk. These animals may help limit shrub invasion which would shade sites that are now open grasslands. There is a strong presence of elk at the study site as evidenced by scats, chewed flowering stalks, and trampling of the area. *Sidalcea hirtipes* rarely sets seed at this site because the flowering stalks are eaten and trampled by elk before seeds can mature. *Sidalcea hirtipes* growth habit as a rhizomatous perennial with vegetatively spreading clones makes it difficult to distinguish individual plants. Recently, Random Amplified Polymorphic DNA (RAPD) has helped identify the genetic variability in a population of *S. hirtipes* (Datwyler, 1995). These techniques are being used to evaluate the conservation of rare species, an area of recent concern (Avise, 1994).

METHODS

This study was conducted to measure the dynamics of a *Sidalcea hirtipes* population on a site which was previously a monoculture of *Senecio jacobaea*. This site was monitored in the summer and early autumn of 1994 and 1995 by measuring the entire area a patch occupied. We located patches with a systematic sweep of the site in 3–4 m intervals. Upon discovering a patch, a rebar was placed in the approximate center

and the distance to the edge of the patch was measured in 8 directions (N, NE, E, SE, S, SW, W, NW) with rebar driven in at each reading. Patch boundaries were not distinct, but were determined by the farthest plant found from the center in the given direction. If the patch was there in year two, we measured a second set of distances from the center to detect whether the patch was spreading, declining, or in stasis. Patch area was determined using Zeiss Interactive Digital Analysis System (ZIDAS), a system that derives measurements from traced images on a digitizing tablet.

RESULTS

The first year's sweep revealed two patches, Patch A (which persisted into year two) and Patch B which was visible only as a few leaves, 19.1 m from the center of Patch A. No plants were evident in year two within 10 m of patch B's origin so no area measurements were taken. Year two revealed a third patch, Patch C, which was 34 m from the center of Patch A (and approximately 15 m from the center of Patch B). Patch A's area expanded from 25.3 m^2 to 36.1 m^2 from 1994 to 1995, a 42.9 percent increase (Figure 3). Patch C covered 35 m^2.

DISCUSSION

From 1994 to 1995 the area of one patch increased. A second patch found in 1994 was not found in 1995, and a third patch appeared in 1995. Since *S. hirtipes* can reproduce by seeds or rhizomes, the increase at the pasture is either from spreading rhizomes or buried seed. If the increase in the population is from rhizomes there will be less genetic diversity in the population. Dimling (1992) found that *Sidalcea malvaeflora* ssp. *elegans* (also characterized by clonal growth [Hitchcock, 1957]), reproduced via large clonal mats, and these plants were obligate outcrossers; self-pollinated plants produced no seed. We speculate that *S. hirtipes* is also an outcrosser.

If the patches at the site of *Sidalcea hirtipes* are primarily rhizomatous this would imply a limitation in the reproductive potential of the species in this population. A recent study using RAPD markers to distinguish the genetic diversity in *S. hirtipes* found that there was more genetic diversity than previously suspected in two populations. No two plants in either of the two populations exhibited identical profiles (Datwyler, 1995). Conservation strategies for rare species like *S. hirtipes* should allow for genetic diversity through outcrossing to avoid a "genetic bottleneck" which would diminish variability within a population.

Our study shows that *Sidalcea hirtipes* has variable patch-dynamics: one patch spread, one disappeared, and one appeared during two years of observation. In addition to competition from associated plants, such as *Senecio jacobaea*, this native perennial may be affected by environmental factors including growing conditions and grazing. Since the decline of tansy ragwort, the response of *Sidalcea hirtipes* to environmental factors may explain the dramatic disappearance and appearance of patches at the site.

This brings up several points for discussion and future research. How did *Sidalcea hirtipes* establish itself at the site, was it from rhizomes or seeds in the soil? How is it spreading, by rhizomes or by seeds? *Sidalcea hirtipes*' showy pink flowers and sexually dimorphic characteristics may be important with insect pollination dynamics (Aaron Liston, personal communication). In Dimling's study (1992) of *S. malvaeflora* ssp. *elegans*, three factors limited seed set: pollination, water, and seed predation. By establishing exclosures to eliminate elk grazing at this site, we can observe sexual reproduction and factors that limit seed set. The Three Rocks Road pasture offers the opportunity to conduct long-term studies on the ecology of a population of *S. hirtipes* that has emerged after successful biological control of a weed.

The increase of development on the coast and the increased human use of protected coastal bluffs is cause for concern about the future of this plant species. There is a danger of shrinking the range of *Sidalcea hirtipes* to only a few protected sites that may not be adequate to sustain genetic variability in the species. The Three Rocks Road pasture offers the opportunity to do long-term studies on the ecology of a population of *S. hirtipes* that has emerged after the successful biological control of a weed. The recent invasion of Himalayan blackberries (*Rubus discolor*) at the Three Rocks Road site is also a serious threat to *S. hirtipes*, a plant that thrives in open areas.

ACKNOWLEDGMENTS

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