

ELEMENT STEWARDSHIP ABSTRACT
for

Vinca major

Periwinkle

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THE NATURE CONSERVANCY

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The Nature Conservancy
Element Stewardship Abstract
For *Vinca major*

I. IDENTIFIERS

Common Name: Periwinkle Global Rank:

General Description:

The following description of *Vinca major* is adapted from Munz and Keck (1973).

Vinca major, a member of the Dogbane Family (Apocynaceae), is a perennial, evergreen herb with erect flowering stems (0.25-0.5 m long) and trailing non-flowering stems (1 m long), which root at the nodes (Gilkey 1957). The stems contain a milky latex. The shiny, dark green leaves are 2-3 cm long, opposite, round-ovate, and pinnately veined. The entire margins are ciliate with hairs 0.1-0.4 mm long, and there are usually numerous hairs along the midribs on the upper surface (Stearn 1973). The blades have a cordate base and are acute to obtuse at the apex. The almost glabrous petioles are 0.5-2 cm long.

The flowers, which are regular and solitary, are borne in the axil of every other leaf. The slender pedicels are 3-5 cm long. The calyx is five-parted with essentially equal lobes of about 1 cm long. The violet or blue corolla (2.5-3 cm long) is salverform, equally five-parted, and with the tube pubescent within. The five stamens alternate with the corolla lobes and are inserted at the summit of the corolla tube. Above the insertion of the stamens is a zone of hairs (Stearn 1973).

The two slender cylindrical follicles are somewhat torulous, about 4-5 cm long, and bear 3-5 seeds. The seeds are without coma.

The features of this species are comparatively larger throughout than those of *V. minor*, its closest living relative. Although both species are grown in cultivation, only *V. major* has established itself as a weed. The characteristics of *V. major* that distinguish it from other California species are its milky latex, dark green leaves, and periwinkle-colored flowers. Since it does not reproduce by seed in California, seedling characteristics are not reported here.

II. STEWARDSHIP SUMMARY

III. NATURAL HISTORY

Habitat:

Vinca major is a native from southern Switzerland southward around much of the Mediterranean basin, from Portugal to Turkey, and across much of north Africa (Lawrence 1959). It has been introduced on many continents as a medicinal herb and

subsequently as an ornamental ground cover (Schittler 1973). It has been cultivated in areas of the U.S. with mild or temperate climates where it has since naturalized. In California, it is known to occur in 12 counties (McClintock 1985).

Vinca major grows most vigorously in moist soil with only partial sun, "but it will grow in the deepest shade, even in poor soil" (Bailey 1914). It is liable to cold damage during hard winters (Stearn 1973). Hot, dry weather will cause *Vinca* to die back as well. It is most frequently found as an escape in, "moist rich soils bordering gardens, lawns, roadsides, cemeteries, and shaded waste places, in localities where it has been planted extensively as ground cover" (Muenscher 1955).

Ecology:

V. major presumably evolved directly from a *V. minor*-like ancestor with a doubling of chromosomes. In *V. major* $2n=92$ and in *V. minor* $2n=46$ (Stearn 1973). Apparently such polyploidy is frequently associated with rampant vegetative growth and poor reproduction by seed (Salisbury 1961). Horticulturists interested in *Vinca major* for ornamental purposes have long been aware that the best means of propagating is by division or by cuttings, as the seeds rarely mature (Bailey 1914).

Reproduction:

In California, *Vinca major* does not reproduce by seed in the wild. Quantitative data on the rate of spread of *Vinca* are not available from the literature. It is most often seen spreading from old home sites. As a result of its shade requirement it often grows in patches around the bases of trees or spreads up and down drainages where the cover is dense. In ideal growth conditions, *Vinca major* can spread with great rapidity by means of its arching stolons, which root at the tips (Salisbury 1961).

IV. CONDITION

V. MANAGEMENT/MONITORING

Threats:

Once established, "it forms a dense carpet to the exclusion of other herbs" (Bailey 1914). This creates a problem where it is competing in areas with native flora (McClintock 1985). It appears to be quite stable in the environment; dry or cold weather may temporarily set growth back, but *Vinca* quickly resprouts and regains lost ground coverage.

Rate of spread is not known from the literature, but usually it spreads only from the point of planting along shady corridors.

Management Requirements:

Former preserve managers at TNC's Santa Rosa Plateau and Ring Mountain preserves in California indicated that the extent of *V. major* on those properties has been increasing. However, monitoring is still required to determine rate of spread and to compare management practices if implemented.

Detailed observations focused on the vegetational change of the affected area over time will help determine what method of control would be most efficient.

This element does require active management to control and/or eliminate it. Researched methods of control are listed below.

MECHANICAL CONTROL

Muenschler (1955) suggests manual removal of Vinca. He advocates raising the runners with a rake and mowing them close or digging them out by hand.

CHEMICAL CONTROL

Hilgendorf (1952) simply recommends, "spraying with the oil-based esters of 2,4-D and kerosene 1 part in 20." Matthews (1962), the principal scientific officer of the Department of Agriculture in Wellington, wrote, "On this plant (*V. major*), 2,3,6 trichlorobenzoic acid (2,3,6-TBA) has been more effective than other materials such as 2,4-D and diesel fuel. (2,3,6-TBA is an amine salt preparation containing 2.4 pounds acid equivalent per gallon. It is sold under the proprietary name of "Trysben 200.") The material must be applied in early spring so that it is washed into the soil, as little or no penetration occurs through the leaf. A rate of 30 lb per acre is recommended. Fenuron (discontinued; formerly manufactured by DuPont) at similar rates is equally effective when applied in the absence of mulch and sufficient moisture."

R. Schonholz, an environmental consultant for Larry Seeman and Associates, Berkeley, CA, explained that environmentally benign herbicides are not effective on Vinca due to the waxy cuticle of the leaves that make chemical penetration difficult. Even the makers of Roundup, an herbicide that biodegrades within a week, advise against its use on Vinca. However, Tom Griggs, Preserve Manager at TNC's Cosumnes River Preserve in California, and Geoffrey Babb, former manager of two TNC preserves in Arizona, have had some success in eradicating Vinca by using Roundup (see MGMT-PROGRAMS below).

The most caustic chemicals, including paraquat (made by Chevron) and "Goal," which contains the active ingredient oxyflurfen, may be considered strong enough to eradicate Vinca due to their persistence.

Monterey County farm advisor Harry Agamalen suggested trying a soil fumigant on affected areas. He recommended clearing the surface growth, laying down a plastic tarp, and fumigating with carbon disulfide, an organic fumigant.

Much of the information available on Vinca major was on how to suppress the weeds that could establish amongst its web-like growth, for in many areas it is still propagated for distribution to nurseries. In one such article, "Effect of trifluralin and melordogyne-hapler chitwood on growth of Vinca major L." (Fuchigami and MacDonald 1968), it was discovered that soil applications of one or more pounds per acre of trifluralin severely

stunted plant growth and caused galls to be produced on the root tips that were macroscopically similar to those produced by the northern root-knot nematodes. Similar difficulties were encountered by Minnesota growers.

BIOLOGICAL CONTROL

No biological controls are known.

At present, methods suggested for controlling the spread and/or eradication of *V. major* are scanty. Mechanical means for control include raising the runners and mowing or complete removal by hand. Herbicides proven successful on *V. major* are 2,4-D, 2,3,6-TBA, and Fenuron, among others. Control programs are currently underway at TNC's Santa Rosa Plateau and Ring Mountain preserves, California, and Mile-Hi/Ramsey Canyon Preserve, Arizona.

VI. RESEARCH

Management Research Programs:

Tom Griggs, Preserve Manager at TNC's Cosumnes River Preserve, has experimented with herbicide methods of control on *Vinca* around the perimeters of a few buildings at TNC's Santa Rosa Plateau Preserve. In January 1985 he applied a 1% solution of Roundup to the infested area. At the time, *Vinca* had new growth approximately 5 cm in length. However, most of the plants' biomass had been produced during the past growing season. After two weeks, the *Vinca* appeared to have stopped growing and all associated grasses were turning yellow. Two months after this treatment, 80% of what was sprayed was dying or dead. The new growth had stopped growing, yellowed and then dropped from the stem.

In some areas within the treated acreage, new growth continued, attaining a height of one foot in two months. This was attributed to incomplete spray coverage. Untreated growth of *Vinca* in the area had also produced one foot of new growth by March 1985. Griggs (1985) planned to apply Roundup solution on actively growing *Vinca* again in the near future.

Greg Wolley, former Preserve Manager at TNC's Ring Mountain Preserve, CA, planned to treat *V. major* in 1985 by applying a 2% solution of Roundup at the beginning of a 7-day forecast of dry weather.

Geoffrey Babb has conducted spray tests of Roundup to eradicate *Vinca* at TNC's Mile-Hi/Ramsey Canyon Preserve in Arizona. He tested nine eradication regimes. Three groups were simply sprayed with Roundup but in various concentrations: 3%, 4%, or 5% solutions. Another three groups were first cut with a scythe and then sprayed with the three different concentrations of Roundup. The last three groups were sprayed in the same way but afterwards covered with clear plastic.

The greatest success occurred in the groups that were first cut, then sprayed. Wounding the plant appears to allow sufficient absorption of the herbicide, which is usually prevented by Vinca's thick waxy cuticle. Although Babb had the greatest eradication success (nearly 100%) using the cut/spray method with a 5% solution of Roundup, he recommends cutting then spraying with a 3% solution (which resulted in a 70-75% success rate in his tests), and then spot treating where necessary.

Treatment should be done after a rain in early or late spring when soil moisture and air temperatures (at least 70 F, preferably 80 F) are best for active plant growth. Continued warm, moist conditions, as with the monsoon season, encourage active growth, quickly translocating the herbicide, helping to kill the plant. Uniform medium to heavy spraying should be done within 5-10 minutes of cutting. The initial spraying is most efficiently done using a back-pack sprayer, with Wickwiper applicators working well for spot treatments and those near a creek.

For follow-up information, contact current preserve managers:

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Tom Wood, Preserve Manager
Mile-Hi/Ramsey Canyon Preserve
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Management Research Needs:

The following are specific questions that need study to improve control efforts:

1. What is the potential for land infested with V. major to recover its native vegetation?
2. Is mowing an effective means of controlling V. major?

VII. ADDITIONAL TOPICS

VIII. INFORMATION SOURCES

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IX. DOCUMENT PREPARATION & MAINTENANCE

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