

---

# PLANTAINS

---

*Integrated Pest Management for Professional Horticulturalists and Home Gardeners*

---

Broadleaf and buckhorn plantain (*Plantago major* and *P. lanceolata*) are major weeds of turf, ornamentals, gardens, waste areas, forage legumes, and pastures. Broadleaf plantain is also known as common plantain and dooryard plantain. Other names for buckhorn plantain are narrow-leaf plantain, ribwort plantain, English plantain, and ribgrass. The genus, *Plantago*, consists of about 250 species worldwide, 16 of which are found in California. Both broadleaf and buckhorn plantain were introduced from Europe and followed the European settlement of North America. One common name for the plantains is “white man’s foot” for this reason. Young leaves of broadleaf plantain are sometimes used as a potherb or in salads or they can be steeped in hot water to produce a tea. Whole seeds have a laxative effect if eaten raw.

## IDENTIFICATION AND LIFE CYCLE

Broadleaf plantain (Fig. 1) is a perennial plant that grows best in moist areas with full sun or partial shade and compacted soil. Its fibrous root system is primarily found in the top 18 inches of soil. The smooth, oval leaf blades are 2 to 6 inches in length with five to seven ribs that parallel the leaf margins (Fig. 3). The leaf veins converge at the base into a broad petiole (leaf stem) that may be up to 5 inches in length. The upright flowering stalk (Fig. 4) terminates in a long cylindrical spike head that may be 2 to 6 inches in length. Seeds are small ( $\frac{1}{16}$  inch in diameter), reddish brown, and angular.



Figure 1. Broadleaf plantain.

Buckhorn plantain (Fig. 2) is a perennial plant that has a taproot and longer, narrower oval leaves (Fig. 3) than broadleaf plantain. Its leaves measure 3 to 12 inches in length, are  $\frac{3}{4}$  to  $1\frac{1}{2}$  inches wide, and have three to five ribs. The blade merges smoothly into the petiole, which is shorter than that of broadleaf plantain. The base of the leaf stalks and the crown of the plant are covered with tan, woolly hairs. The flowering stalk (Fig. 4) of buckhorn plantain is much longer than that of broadleaf plantain; it measures from 12 to 18 inches. Its dense spike of flowers is about 1 to 2 inches in length and shorter than the spike of broadleaf plantain. Seeds are black, shiny, boat shaped, and about  $\frac{1}{16}$  inch in length.

Both species are found throughout the state and grow year-round except in the coldest intermountain areas where they are dormant during the coldest months. They produce a fairly weak root system. Buds grow from the uppermost area of the root, pro-



Figure 2. Buckhorn plantain.

ducing a crown that can regenerate “new” plants even when the plant is cut off at or below the soil surface. There are no true stems; rather, the leaves are clustered in a rosette at the base of the plant.

Seed germination occurs at or very near the soil surface. The seed will germinate when soil moisture is adequate and soil temperature reaches 50°F; however, germination is more rapid as temperature increases. The ideal temperature for germination is around 77°F. Germination occurs throughout the growing season. Seedling growth is slower in cold weather. The seedling stage can last 8 to 15 weeks, depend-

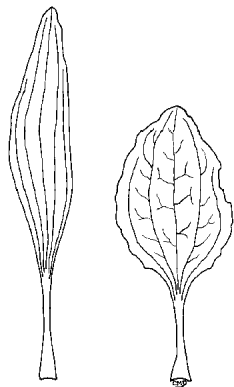


Figure 3. Leaves of buckhorn plantain (left) and broadleaf plantain.

ing on temperature and growing conditions.

Flowering begins soon after the seedling stage and continues throughout the life of the perennial plant. Broadleaf plantain can survive for many years, developing a thickened crown 6 to 10 inches across with fibrous roots, whereas buckhorn plantain has a stout taproot. These perennial plants are well adapted to irrigated areas where frequent mowing or grazing is practiced. This includes lawns, pastures, and alfalfa fields. Buckhorn plantain will tolerate drought when it is well established.

### IMPACT

Plantains can be a major weed problem for turfgrass or ornamental managers. In turfgrass they form dense clumps that give poor footing for athletic fields and golf courses. The plantains have a texture and color that varies from normal turf cultivars, and their flower stalks extend above the turf, reducing its aesthetic quality.

When plantains infest turfgrass or ornamental plantings, they usually form dense populations of individual plants. Plantain crowds out desirable species and reduces the vigor of those plants that survive. Because of the extensive crowns, hand-pulling or hoeing to remove plantain is usually



Figure 4. Flowering stalk of buckhorn plantain (left) and broadleaf plantain.

futile unless repeated over a long time. Control by this means is usually most successful in a home garden or lawn. Because the leaves lie close to the ground, mowing is not an effective control.

Once a few plants become established in turfgrass or ornamental areas, seed and plant parts can contaminate equipment, particularly lawn mowers, and spread to new areas.

Buckhorn plantain is also a weed problem in nontilled orchards, irrigated pastures, and alfalfa and clover fields where mowing is used for weed control. It is usually most serious in the intermountain regions of California where alfalfa and irrigated pastures remain in production for long periods (more than 5 years). Although slow to establish, buckhorn plantain is difficult to control when mature because of its extensive crown system.

### MANAGEMENT

Solitary new plantain seedlings along fence rows, roadsides, flowerbeds, and in turf should be removed before they produce seed. The area should then be monitored for several months to make sure that removal was com-

plete. Areas with infestations should be isolated and seed heads removed until control can be accomplished. Turfgrass and ornamental areas should be well maintained to assure maximum vigor. A healthy competitive landscape will slow invasion of these weeds. Dense stands of turf and ornamentals will shade the soil surface making establishment of new plantain seedlings more difficult.

### Turfgrass

No single procedure has been successful in controlling plantain in turfgrass. Early removal of new seedlings has been successful when practiced diligently. Digging out perennial plantain plants must be done regularly for several years to be successful. Repeated applications to perennial plants with products containing 2,4-D or triclopyr can be helpful. Once these weeds are killed in open sites, these areas should be overseeded to establish a vigorous turfgrass sod.

Preemergent turfgrass herbicides commonly used for crabgrass control have not been successful in limiting germination of plantain. Isoxaben, a relatively new broadleaf preemergent herbicide, has been effective in limiting germination of plantain in turfgrass.

Postemergent broadleaf herbicides (2,4-D, triclopyr, MCPA, and mecoprop) can control plantain seedlings, but control of established plantain plants with postemergent treatment is much more difficult. For established plants, 2,4-D works best while triclopyr, MCPA, and mecoprop will only reduce its vigor. Best control is achieved from a fall application. Repeat applications are needed to kill weakened perennial weeds and new germinating seedlings.

### Ornamentals

There are few options for the control of plantain in ornamental plantings. Prevention is very important. Hand-removal or spot treating of solitary

plants with glyphosate will save time and money in the long run. Pulling or hand-hoeing is helpful if done periodically during the year. However, regrowth from the extensive crown system limits the effectiveness of this method.

Mulching with landscape fabrics can be effective for controlling seedlings of both species. Even established broadleaf plantain can be controlled if the fabric is overlapped and no light is allowed to penetrate to the soil. Use a polypropylene or polyester fabric or black polyethylene (plastic tarp) to block all plant growth. Cover fabric mulches with an organic mulch to improve aesthetics. Organic mulches may also effectively control plantain seedlings if they are at least 3 inches deep and are managed in such a way that prevents the mulch from serving as a growth medium for new plantain seedlings.

The preemergent herbicide isoxaben has been useful in limiting emergence

of plantain seedlings. It must be applied before the weed seed germinates in order to be successful. If isoxaben is used, a light hoeing may be necessary to control any seedlings that escape the treatment.

Spot treatment with glyphosate can control existing plantain plants in established ornamental plantings, but do not spray or let glyphosate drift onto desirable plants or phytotoxic injury will result. If spraying is not feasible, remove plants by digging out their crowns.

### **Alfalfa, Clover, and Irrigated Pastures**

By preventing isolated plantain plants from producing seeds in and around production fields, you can reduce the seed source for new seedling establishment. A healthy vigorous crop stand can shade out and discourage germination of new seedlings. Preemergent treatment with hexazinone in alfalfa has been successful in controlling seedling germi-

nation of plantain. No postemergent herbicide has been entirely successful in the control of established plantain plants; however, where it can be safely used in pastures and clover 2,4-D can reduce plantain vigor.

### **Orchards**

Plantain can be managed in orchards through summer cultivations or by maintaining a competitive cover crop. Glyphosate is often used to spot treat individual plants.

### **REFERENCES**

Blom, C. W. 1978. Germination, seedling emergence and establishment of some *Plantago* species under laboratory and field conditions. *Acta Botanica Neerlandica* 27:257-271.

Hawthorn, W. R. 1974. The biology of Canadian weeds. 4. *Plantago major* and *P. rugelii*. *Can. J. Plant Sci.* 54:383-396.

For more information contact the University of California Cooperative Extension or agricultural commissioner's office in your county. See your phone book for addresses and phone numbers.

AUTHORS: D. Cudney, C. Elmore

EDITOR: B. Ohlendorf

TECHNICAL EDITOR: M. L. Flint

DESIGN AND PRODUCTION: M. Brush

ILLUSTRATIONS: C. M. Dewees

PRODUCED BY IPM Education and Publications, UC Statewide IPM Project, University of California, Davis, CA 95616-8620

This Pest Note is available on the World Wide Web (<http://www.ipm.ucdavis.edu>)



To simplify information, trade names of products have been used. No endorsement of named products is intended, nor is criticism implied of similar products that are not mentioned.

This material is partially based upon work supported by the Extension Service, U.S. Department of Agriculture, under special project Section 3(d), Integrated Pest Management.

#### **WARNING ON THE USE OF CHEMICALS**

Pesticides are poisonous. Always read and carefully follow all precautions and safety recommendations given on the container label. Store all chemicals in the original labeled containers in a locked cabinet or shed, away from food or feeds, and out of the reach of children, unauthorized persons, pets, and livestock.

Confine chemicals to the property being treated. Avoid drift onto neighboring properties, especially gardens containing fruits and/or vegetables ready to be picked.

Dispose of empty containers carefully. Follow label instructions for disposal. Never reuse the containers. Make sure empty containers are not accessible to children or animals. Never dispose of containers where they may contaminate water supplies or natural waterways. Do not pour down sink or toilet. Consult your county agricultural commissioner for correct ways of disposing of excess pesticides. Never burn pesticide containers.

The University of California prohibits discrimination against or harassment of any person employed by or seeking employment with the University on the basis of race, color, national origin, religion, sex, physical or mental disability, medical condition (cancer-related or genetic characteristics), ancestry, marital status, age, sexual orientation, citizenship, or status as a covered veteran (special disabled veteran, Vietnam-era veteran, or any other veteran who served on active duty during a war or in a campaign or expedition for which a campaign badge has been authorized). University Policy is intended to be consistent with the provisions of applicable State and Federal laws. Inquiries regarding the University's nondiscrimination policies may be directed to the Affirmative Action/Staff Personnel Services Director, University of California, Agriculture and Natural Resources, 1111 Franklin, 6th Floor, Oakland, CA 94607-5200; (510) 987-0096.