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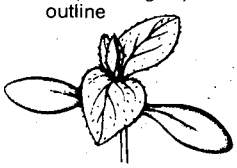
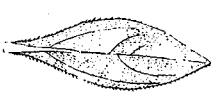
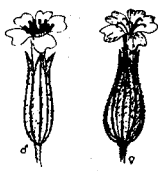
Identification and Control of White Cockle and Nightflowering Catchfly

White cockle (*Lychnis alba*) and nightflowering catchfly (*Silene noctiflora*) are serious weed problems in small grains, alfalfa, clover, and grass seed fields. Cockle and catchfly are spread chiefly as impurities in crop seed, especially in timothy and clovers. About 10 percent of the timothy seed intended for certification in Minnesota is rejected each year because of the presence of cockle and catchfly seed. About two-thirds of the poundage rejected is for white cockle; about a third is for catchfly.

Cockle and catchfly generally prefer dry, well-drained soils and are more common in sandy or sandy loam soils than in clays. Disturbed areas, such as fields, roadsides, pastures, grass embankments, and waste places in general, are characteristic habitats of white cockle and nightflowering catchfly.

Cockle and catchfly belong to the pink family (*Caryophyllaceae*) and are similar in appearance during early vegetative stages. The plants differ, however, in growth habit and flower and seed characteristics. They can be distinguished easily during and after bloom, as shown in the accompanying chart.

Plant characteristics	White cockle	Nightflowering catchfly
Life span	Biennial or short-lived perennial (2 or more years to complete life cycle)	Annual or winter annual (1 year to complete life cycle)
	Overwinters as basal rosette or crown and as seed	Overwinters as seed or as basal rosette
Seed		
Germination usually occurs	Spring or early summer	Spring, but also can occur in summer or fall
Production usually occurs	Mostly in second year of life cycle but occasionally during first year	First year of life cycle (may be fall if spring-seeded or following summer if fall-seeded)
Seedling	Cotyledons (seed leaves) tend to be somewhat quadrangular (four-angled) in outline	Cotyledons tend to be oval in outline
		
Basal leaf	Tends to be somewhat quadrangular in outline	Tends to be oval in outline
		

Plant characteristics	White cockle	Nightflowering catchfly
Stem	Thick, almost woody; densely covered with short, simple hairs	Medium stem, not woody; covered with sticky (glandular) hairs
Flower		
Petals	White to light pink; shallowly lobed	White, pink, or yellow; more deeply lobed
		
Type of flower development	Imperfect flowers (male and female flowers on separate plants)	Perfect flowers (male and female flower parts in each flower)
Number of flower parts	Sepals and petals, 5; styles (female flowers), 5; stamens (male flowers), 10	Sepals and petals, 5; styles, 3; stamens, 10
Number of teeth on top of seed capsule	10 	6 
Leafy bracts below flowers	Downy, short hairs	Glandular, long hairs; top of plant sticky
Number of veins on calyx (outer covering of seed pod)	10 on male, 20 on female; light green to brown; tend to be parallel-veined	10; prominent; very dark green; tend to be cross-veined

Life Cycle

White cockle begins growing early in the spring, either from seed or from the previous year's basal rosette. Second-year plants begin flowering in June and continue through September or October. Seed capsules open to shed their seed 4 to 6 weeks after bloom, but seeds are viable 2 to 3 weeks after pollination. Mature seeds may germinate as soon as they shatter from the capsule, or they may germinate the following spring. Not all plants produce seed, since white cockle is dioecious (male and female flower parts occur on separate plants). Female plants are capable of producing 1,600 to 24,000 seeds per plant, an enormous amount.

Nightflowering catchfly is more common in northern Minnesota. Seed generally germinates from mid-April to mid-July. Flowering begins in mid-June and may continue through September. Ripe seeds are produced about 1 month after bloom. Some seeds germinate in the fall but most overwinter and germinate in the spring. Catchfly produces 2,000-3,000 seeds per plant.

Mechanical Control

Cultivation or tillage for seedbed preparation will kill many white cockle and nightflowering catchfly plants. Both species, however, are able to survive regular cultivations because well established plants usually are not killed and tillage promotes germination of more seed. Tillage may provide suitable control in row crops or prior to seeding small-seeded grasses or legumes. Cultivation is impractical in permanent pastures or established perennial crops; herbicides offer a better alternative.

Chemical Control

White cockle and nightflowering catchfly can be controlled more easily in field crops when these weeds are in the seedling stage or during seed germination. White cockle plants are difficult to control during the second year of growth and development after flowering begins. Because most white cockle plants require 2 years to complete their life cycle and produce seed, white cockle is more difficult to control in close-sown crops such as grass seed production fields, alfalfa and clover fields, and other sod crops that are usually maintained for 2 or more years without tillage.

Grass Seed Production Fields

Dicamba (Banvel) is the best herbicide for controlling white cockle and nightflowering catchfly in grass seed fields. For best results it must be applied when weeds are in the two- to four-leaf seedling stage. Dicamba can be used in both newly seeded or established perennial grasses grown for seed, including timothy, bluegrass, or lawn-type fescues. Fields should be checked frequently during the year. If seedlings of white cockle and catchfly appear, dicamba should be applied at ½ to 1 pint per acre (4 to 8 ounces acid equivalent per acre). Use the lower rate in new seedings and when weeds are small; use the higher rate when weeds become larger.

A mixture of dicamba and 2,4-D or MCPA amine also can be used. Bromoxynil can be used on grass seed production fields, but it is effective only on seedling plants of white cockle or nightflowering catchfly. It can, however, be used on newly planted grasses for sod or seed production. Apply ⅜ pound per acre of active ingredient (1½ pints per acre of a 2-pound-per-gallon formulation) after grasses emerge and before weeds are past the three- to four-leaf stage. Do not use treated grasses for grazing or livestock feed.

Small Seeded Legumes (Alfalfa, Birdsfoot Trefoil, Clovers)

For Establishment. Benefin (Balan) is the most effective herbicide for seedling cockle or catchfly control in new seedings of alfalfa; birdsfoot trefoil; and red, alsike, and ladino clovers. Apply 1⅛ to 1½ pounds per acre (3 to 4 quarts per acre), depending on soil type, and incorporate into the soil prior to seeding. Use the low rate on coarse textured soils that are low in organic matter (sands and sandy or silt loams) and the high rate on fine textured soils (silty clay and clay loams). Benefin is not recommended on muck soils or soils that are high in organic matter and should not be used if a grass companion or forage crop is to be planted with the legume.

EPTC (Eptam 7-E) is less effective on white cockle seedlings than Benefin (Balan) is, but it can be used in new seedings of alfalfa, birdsfoot trefoil, or clovers. Apply 3 to 4 pounds per acre (3 1/3 to 4½ pints per acre) and incorporate just before planting. Do not use on white Dutch clover or if a grass companion crop is to be planted with the legume.

The herbicide 2,4-DB (Butyrac, Butoxone) is cleared for use in both newly seeded and established alfalfa and in most other forage legumes for controlling certain broadleaf weeds after emergence of crop and weeds. It does not, however, give satisfactory control of either white cockle or nightflowering catchfly.

For Established Stands. Metribuzin (Sencor or Lexone) will control first-year white cockle rosettes when applied at 0.5 to 1.0 pound per acre (1 to 2 pounds Sencor or Lexone 50-percent wettable powder or 1 to 2 quarts Sencor 4 or Lexone 4L) to dormant established crops of alfalfa. Injury may occur if the crop is not dormant or if the herbicide is applied earlier than 12 months after seeding. Do not graze or harvest within 28 days after application.

Simazine can be applied to pure alfalfa stands for white cockle control if stands are at least 1 year old. Rates depend on soil type: use 0.8 pound per acre of simazine (1 pound per acre Princep 80W) for sandy loam soils; 1.2 pounds per acre simazine (1.5 pound per acre Princep 80W) for loam soils; and 1.6 pounds per acre simazine (2 pounds per acre Princep 80W) for clay soils. Simazine should not be used on sands or on loamy sand soils. Simazine can be applied once a year in the fall after the last cutting but before the ground has frozen for the winter. Alfalfa can be actively growing, semi-dormant, or dormant when application is made. Allow 30 days between application and grazing of dairy or beef cattle and sheep and 60 days between application and cutting for hay.

Alfalfa that has been established for 1 year or more can be treated with terbacil (Sinbar). A single application should be made at a rate of ½ to 1½ pounds per acre in the fall after plants become dormant or in spring before new growth starts. For semi-dormant or nondormant varieties, apply in fall or winter after the last cutting or in spring before new growth starts. Terbacil should not be used in seedling alfalfa or in alfalfa-grass mixtures. Do not apply on snow-covered or frozen ground, and do not use on sand, loamy sand, or gravelly soils or on soils with less than 1 percent organic matter or crop injury will result. Do not plant other crops within 2 years after treatment with terbacil.

Small Grains

Dicamba (Banvel) can be applied to spring seeded wheat or oats at ⅛ pound acid equivalent per acre (¼ pint per acre of the 4-pound-per-gallon formulation). Cockle or catchfly growth may only be suppressed at this low rate, however. Dicamba should be applied when wheat or oats are in the two- to five-leaf stage. A mixture of dicamba at ⅛ pound per acre plus MCPA amine (Mon-Dak) at ¼ pound per acre also can be used. Do not use dicamba if the oats or wheat are underseeded to a legume.

Bromoxynil (Brominal, Buctril) can be applied to wheat, barley, oat, or rye fields at a rate of ¼ to ⅜ pound per acre (1 to 1½ pints per acre of a 2-pound-per-gallon formulation or ½ to ¾ pint per acre of the 4-pound-per-gallon formulation). Bromoxynil will control only small seedlings of cockle and catchfly. Application should be made after small grains emerge but before weeds are past the three- or four-leaf stage. Bromoxynil should not be applied to small grains during or after the boot stage or when crops form a canopy over weeds. Do not graze treated fields for 30 days after application. A mixture of bromoxynil and MCPA ester (Brominal Plus, Bronate) can be used at ¼ + ¼ pound per acre.

Picloram (Tordon 22K) at a rate of ¼ to ⅜ ounce per acre (1 to 1½ fluid ounces per acre) can be tank-mixed with ¼ to ⅜ pound per acre (½ pint to ¾ pint of a 4-pound-per-gallon formulation) of 2,4-D amine or MCPA amine and applied to spring wheat and barley between the four-leaf and early boot stage for controlling seedling white cockle, nightflowering catchfly, and other broadleaf weeds. Picloram is very persistent, however, and broadleaf crops, including new legume seedings, are likely to be injured or killed if planted the following year. (See herbicide label).

Corn, Soybeans, Sunflowers, Pasture

White cockle and nightflowering catchfly are less of a problem in corn, soybeans, and sunflowers because cultivation or most commonly used broadleaf herbicides provide effective control.

Dicamba (Banvel) or picloram (Tordon) gives effective control of white cockle in grass pastures or in noncropland areas where these herbicides can be used safely. Glyphosate (Roundup) also can be used for spot treatment of individual plants in most crops. Refer to University of Minnesota Agricultural Extension fact sheets and folders for weed control recommendations in individual crops. Check herbicide labels for precautions regarding use and for additional information.

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