

MAJOR INSECT PESTS OF BRASSICAS

Crucifer flea beetles (*Phyllotreta cruciferae*) are black and shiny, about 2 mm long and only feed on Brassica crops. Adults spend the winter in shrubby or woody borders, and move into fields in May. Eggs are laid in soil near the plant. Larvae feed on root hairs and pupate underground. New adults emerge in late July or early August and feed throughout August. Crops with more waxy leaves (cabbage, broccoli, kale) are less attractive while crops with non-waxy leaves (bok choy, Nappa cabbage, mustard) are highly attractive, and the whole leaf is damaged.



Imported cabbageworm (*Pieris rapae*) adults are common day time flyers; white with two black spots on the forewing. Eggs are laid singly on the underside or top of leaves, about 1/8" long, light green and slightly elongated, standing upright. Caterpillars are gray-green, slightly fuzzy, and sluggish. They grow to > 1" and favor the center of the head as it gets larger. They produce wet green frass (droppings). The crysalis (pupa) is green or brown, smooth with three ridges on the back, and attached to a leaf. *Cotesia rubecula* is a parasitic wasp host specific to imported cabbage worm.



Diamondback moth (*Platella zylotella*) adults are <1/2" light brown, with a yellow diamond mark and rest with their wings folded like a tent. In the spring, eggs can be found; small, almost round, yellowish-white. Caterpillars are very wiggly when poked, pointed on both ends, not fuzzy, and grow to 3/4". They feed all over the plant. Pupae are white silken cocoons, with a green full-grown caterpillar or a brown pupa inside. Four to six generations occur annually depending on summer temperatures. Adults overwinter in plant debris or in the soil. Populations are suppressed by natural enemies, which include parasitic wasps that attack larvae.



Cabbage looper (*Trichoplusia ni*) adults usually arrive from the south in July – August and fly at night so are rarely seen. Moths are mottled gray-brown, 3/4 inch long, with a distinct round silver-white mark on the wing. Eggs are round, light green or yellow, and are laid underneath the foliage. Caterpillars are light green, with wavy white or light yellow lines down the back and sides, reaching 1 1/2 to 2 inches when full grown. They will raise the middle of their body in a characteristic "loop" shape. They eat large holes in leaves. They also feed on celery, spinach and chard.



Cross striped cabbage worm (*Evergestis rimosalis*) is new pest to Southern New England. Unlike the three major caterpillar pests on Brassicas, the cross-striped cabbageworm lays its eggs in batches (3 to 25) rather than singly. Egg batches are yellow, flattened, and attached to the lower leaf surfaces. Larvae grow to 3/4"-long in 2 to 3 weeks. The caterpillars are light bluish-grey on top and green underneath, with numerous black bands across their backs and a yellow line down each side. It has 2 to 3 generations per year, most abundant on late season plantings.



Cabbage root maggot (*Delia radicum*) adults are delicate humpbacked gray-brown flies. Small white bullet shaped eggs are laid in soil at base of plants. Adults emerge in spring, and egg survival is dependent on cool wet conditions. There are 3 generations per year, and the summer generation usually does very little damage. Yellow rocket bloom is good indicator of spring adult flight and golden rod bloom is a good indication of the emerging 3rd generation. Symptoms include wilting and yellowing or purpling of outer leaves. On inspection of the root area you may find the legless white maggots feeding, or the small brown, oblong pupae.



Cabbage aphid (*Brevicoryne brassicae*) Treat if greater than 10% of plants are infested with aphids any time after heads or sprouts (Brussels) begin to form. Aphids tend to be more of a problem in fall plantings and on broccoli and Brussels sprouts.



MAJOR DISEASES OF BRASSICAS

Alternaria leaf spot is made up of three species:

Alternaria brassicicola, *A. brassicae*, and *A. raphani*. The most common symptom is yellow, dark brown to black circular leaf spots with target like, concentric rings. Lesion centers may fall out, giving the leaf spots a shot-hole appearance. Individual spots coalesce into large necrotic areas and leaf drop can occur. Lesions can occur on

petioles, stems, flowers, flower pedicels, and seed pods. *Alternaria* species are parasites that survive saprophytically outside the host. Diseased crop debris is the primary site of survival from year to year. Resting spores (chlamydospores, microsclerotia) have been reported. The diseases are favored by 60-78° F and at least 12 hours of relative humidity of 90 % or more. The fungi sporulate profusely and are spread throughout fields by wind, splashing water, equipment, and workers. The main means of introduction into new areas is on infested seed. Infection of broccoli and cauliflower heads can lead to complete deterioration of the heads. Affected cabbage do not store well as lesions provide entry for secondary soft-rotting organisms. Heavy infections of foliage reduce plant vigor and yield.



Black Rot is caused by *Xanthomonas campestris*, one of the most devastating diseases of cruciferous crops and can result in high losses of yield and quality. Symptoms can appear at any growth stage as yellow, V-shaped lesions that extend toward the base of the leaf resulting in wilt and necrosis. Blackening of veins in lesion and adjacent areas is a diagnostic feature of this pathogen.

Xanthomonas campestris pv. *campestris* is a bacterium that plugs the water-conducting tissue of the plant with xanthan, a mucilaginous sugar. Its most important means of transmission is on seed and as little as 0.03% infection can cause epidemics. The bacteria can persist in infected plant debris for up to two years; it survives in the soil for 40-60 days. The pathogen may move into the petiole and spread up the stem or into the roots and become systemic. Black Rot is favored by warm temperatures and symptoms may not appear in the seedbed, allowing infected plants to be transplanted into the field. It is spread within the field by splashing water, wind, equipment, people, and insects.



Brassica Downy Mildew (*Hyaloperonospora parasitica*)

Small, angular lesions develop on leaves and inflorescences. These lesions enlarge and become irregular, yellow to orange necrotic patches, with dense gray to purple sporulation on leaf undersides. A pale brown to gray discoloration occurs on the surface of heads or curds and black streaks may develop on the stems. Affected tissues become susceptible to a tttack by secondary rotting organisms. Downy mildew also attacks the taproots of turnip and radish and infected organs develop a black, epidermal blotch and an internal discoloration. Downy mildew overwinters on cruciferous weeds. Secondary sporangia are spread by wind and splashing water. Oospores, if produced, survive in crop residues and in the soil. There is some evidence that *H. parasitica* may be seed borne. The pathogen is favored by cool, moist conditions. On seedlings, cotyledons and hypocotyls may become infected and seedling loss can occur.



Boron Deficiency, Hollow Stem. Crucifers, in particular cauliflower, rutabaga, and turnip are susceptible to boron deficiency. Boron deficiency occurs most frequently on coarse or sandy soils, soils with a pH greater than 7.0, and soils subject to excessive leaching. Boron also becomes less available during long periods of drought. Irrigation to maintain an even soil moisture may prevent this disorder. Soils deficient in boron can be treated with a boronated fertilizer. In high pH soils, foliar applications are preferred. Application of boron after symptom expression is usually too late to prevent the problem. There is some cultivar variation in susceptibility to boron deficiency.

