Natural Heritage &
Endangered Species
Program

Commonwealth of Massachusetts
Division of Fisheries & Wildlife
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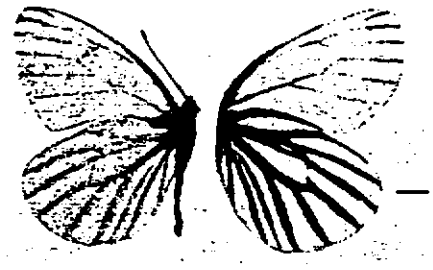
MASSACHUSETTS SPECIES OF SPECIAL CONCERN

Mustard White Butterfly
(Pieris napi oleracea)

DESCRIPTION: The physical appearance of Mustard White Butterflies depends on whether they develop from a spring or summer brood. The spring butterflies have grey-brown or grey-green veins on the front of their hind wings, whereas the summer butterflies are pure white. Butterflies of both broods are white above. Their wing span is from about 2.3 cm (1.3 to 1.6 inches). The larvae are green with greenish-yellow stripes.

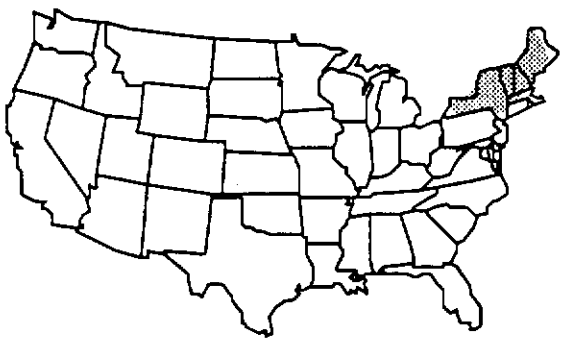


Klots, Alexander B. A Field Guide to the Butterflies of North America, East of the Great Plains. Boston: Houghton Mifflin Co., 1951.

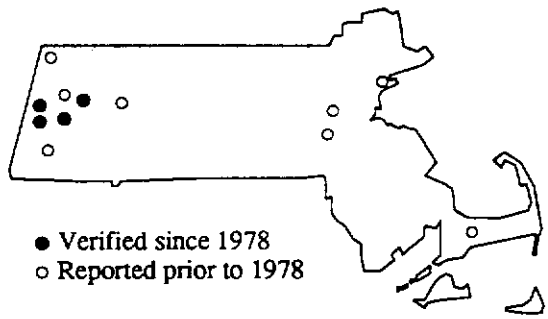
SIMILAR SPECIES: There are several other species in the family Pieridae that occur in Massachusetts. The West Virginia White Butterfly (*Pieris virginiensis*) can be distinguished by its grey color and the weaker, less sharp streaks of brown on the veins on the wings. The wings of the European Cabbage Butterfly (*Pieris rapae*) are sturdier looking with a lack of veining, and there are spots on the forewing. The flight of the Mustard White is more rapid than the West Virginia White's, and is closer to the ground than that of the European Cabbage Butterfly. While all three fly together in spring, the West Virginia White is not present after June 1. In addition, European Cabbage is an open-habitat butterfly that rarely flies in woods; West Virginia White is a woodland butterfly; and Mustard White flies in both woods and open habitats but is never very far (7 1/4 miles) from woods.

RANGE: Historically, the Mustard White Butterfly, *Pieris napi oleracea*, has included southern Canada and Ontario, parts of New England, and parts of New York in beech-maple-hemlock woods.

HABITAT IN MASSACHUSETTS: The actual habitat in Massachusetts of *P. napi oleracea* is rich woods consisting of beech, maple, and hemlock. In Vermont, the habitat broadens to include northern cedar swamps.



Documented USA Range of
Pieris napi oleracea
(Subspecies of Mustard White Butterfly)



Distribution in Massachusetts

LIFECYCLE/BEHAVIOR: Little has been written about the ecology and behavior of the Mustard White Butterfly. Male Mustard Whites patrol during most warm daylight hours in search of receptive females. Mating occurs from midday to early afternoon. This butterfly is doubly brooded with a third small brood in most years, including the populations in the Berkshires. The later broods will usually overwinter as pupae. The spring brood individuals restrict their activities more to woodlands, and the later broods are found more in open areas. The eggs are oval, and pale green as is the mature caterpillar, which is characterized by a dorsal stripe and yellow-green stripes on the sides. Single eggs are deposited beneath young host leaves of various mustards and cresses. Toothwort (*Dentaria diphylla)* is the main spring host. Rock cress (*Arabis spp.*), mostly native, and the introduced Eurasian/non-native species of water cress (*Nasturtium officinale*), mustard (*Brassica rapa*), and winter cresses (*Barbarea orthoceras* and *B. vulgaris*) are host plants that are eaten by the caterpillars if available.

POPULATION STATUS IN MASSACHUSETTS: The Mustard White Butterfly is currently listed by the Massachusetts Division of Fisheries and Wildlife as a **"Species of Special Concern"**. Its distribution and abundance in the state have not been well documented but it is believed to be in decline. There are records of Mustard Whites swarming in Harvard Yard in Cambridge about 1857. Since the introduction of the European Cabbage Butterfly (*P. rapae*), the Mustard White has become quite rare in New England. While the more aggressive European Cabbage Butterfly dominates the open fields, meadows and countryside, the Mustard White has retreated to the mountains and shaded forests. Though the introduction of *P. rapae* may be a factor in population decline of *P. napi oleracea*, a more likely explanation is decreasing understory or loss of herbaceous layer in eastern Massachusetts . Other factors in its disappearance are the continued fragmentation of woodland habitat, aerial spraying of insecticides to combat Gypsy moths and mosquitoes, and the establishment of non-indigenous (Asian or European) species. One such case in point is the recent introduction of garlic mustard (*Alliaria petiolata)* to wooded areas in the Berkshires presenting *P. napi oleracea* and *P. virginiensis* with a novel, attractive host that seems to attract them while being lethal to their caterpillars.

Historically or prior to 1978, there were 8 populations recorded in 8 towns in the state. Since 1978, there have been 5 verified (or reverified) populations in 4 towns reported to the Massachusetts Natural Heritage and Endangered Species Program.

MANAGEMENT RECOMMENDATIONS: In order to maintain the existing populations of Mustard White butterflies, every effort should be made to protect the woodland habitat where it is currently found. It is critically important to preserve and encourage understory stands of toothwort, an essential spring host -(winter -cress (*Barbarea spp.)* supports poor larval survival and is not native.) Otherwise, encouraging understory will do nothing for this species. Other possible hosts are mustard (*Brassica rapa*), an annual weed usually of hayfields and roadsides; watercress (*Nasturtium officinale)*, an introduced watercress found only in very wet spots with running water; and rock-cress (*Arabis)* found on ledges and generally sparsely distributed. These hosts are less desirable and more habitat specific. For this and other reasons of plant community integrity as well, special attention should be paid to removing garlic mustard before it becomes well established. There is preliminary evidence that *P. napi oleracea* may be adapting to this plant, *P. virginiensis* does not survive, and the plant is a significant population sink for eggs. Removing shrubs would encourage the herbaceous layer, including those plants favored by the Mustard White. Logging that opens the canopy without producing tangles of slash or shrub growth would probably encourage the Mustard White populations. Aerial spraying of insecticides to combat Gypsy moths and mosquitoes should not occur in or within close proximity of the habitat of the Mustard White.

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