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Version 1
12 October 2016

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The large white or large cabbage white, *Pieris brassicae* (Linnaeus), is an invasive pest that is present throughout mainland Europe, Asia, and North Africa. Due to its migratory nature and broad host range, populations can be widespread. Larval hosts are primarily plants in the family Brassicaceae. Larvae feed on all leaf parts and can be highly destructive, leading to significant crop loss due to skeletonization of the host. Larvae also cause aesthetic damage to crops through feeding and excess frass production. This species completes up to 4 generations in central Europe and up to 7 in more southern regions. Several non-target species with similar feeding habits and morphology are present in North America including: *Pieris rapae*, *P. virginiensis*, *P. marginalis*/*P. oleraceae*, *Pontia protodice*, *Ascia monuste*, and *Appias drusilla*. The presence of these similar species and the broad host range indicate a potential for establishment of *P. brassicae* in North America if introduced.



Fig. 1. *Pieris brassicae* female with wings spread (photo by S. Sepp, commons.wikipedia.org).

Pieris brassicae is a member of the Pieridae, a family with over 1,000 species and a wide variety of ranges, larval hosts, and coloring. Forewings of both sexes of *P. brassicae* are a creamy white or very pale yellow with distinct black markings that curve slightly down the termen at the wing apices and two black spots on the ventral sides of the forewings. Forewing length measures 25-35mm and antennae are black with white tips. The female can be distinguished from the male by having two black spots on the dorsal forewing. This species also displays seasonal variability with both males and females of spring broods appearing slightly lighter with greyer markings, while the summer generations have very dark markings. Morphology of *P. brassicae* is quite similar to that of *Pieris rapae*, the cabbage white, which is one of the most common butterflies in North America. *Pieris rapae* can be distinguished from *P. brassicae* by its smaller size and the dark marks at the wing apices, which do not extend down the termen (see Level 1 screening for size and color comparisons). Larvae of *P. brassicae* and *P. rapae* are easily distinguished by coloration differences.



Fig. 2. *Pieris brassicae* resting on *Buddleja davidii* (photo by Thomas Bresson, commons.wikimedia.org).

Sorting

Large White *Pieris brassicae* (Linnaeus)

Pieris brassicae visual surveys should note the presence of butterflies of the appropriate size, color, and shape. The large cabbage white is most easily confused with *P. rapae*, one of the most common butterflies in the U.S. (Figs. 4-9), but *P. rapae* can be distinguished from *P. brassicae* by its smaller size (mean FWL = 31mm vs. 22mm), lighter wing markings, and dark marks at the apex of the forewing, which do not extend down the termen. Other common non-targets in the Pieridae are shown in Figs. 13-23. Most are smaller than *P. brassicae* and have different wing patterns. The only species similar in size to *P. brassicae* are some southern migrants such as *Appias drusilla* and *Ascia monuste*. These can be distinguished from *P. brassicae* by wing pattern: *A. drusilla* lacks dark wing markings, while markings in *A. monuste* are more brown and extensive than in *P. brassicae*, and both of these species lack forewing spots (Figs. 21-23).

- 1) Butterflies have a forewing length of 25-35mm (0.5-0.9 inches).
- 2) Butterflies have an overall shape and coloration similar to those in Figs. 3a-d:
 - * dark wing tips that extend down the termen in contrast to those of *P. rapae* that are confined to the wing apex
 - ** females will have two spots and a dash on the dorsal forewing
 - *** both sexes have two dark spots present on the ventral side of the forewing.
- 3) Butterfly antennae are clubbed as in Figs. 3a-d.

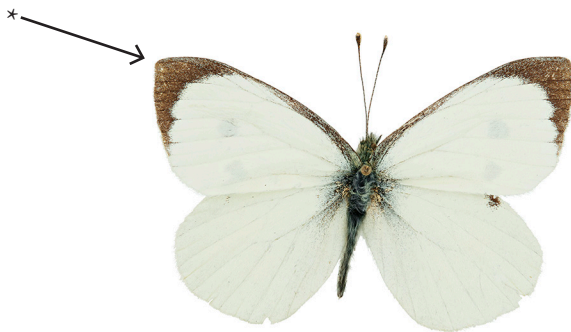


Fig. 3a. *Pieris brassicae* male



Fig. 3b *Pieris brassicae* male



Fig. 3c *Pieris brassicae* female



Fig. 3d *Pieris brassicae* male
(ventral)

(Figs. 3a-d are actual size.)

Level 1 Screening/Non-targets

Large White *Pieris brassicae* (Linnaeus)

Figures 4-23 portray wing patterns and relative sizes (at 75% scale) of target and non-target species.



Fig. 4. *Pieris rapae*



Fig. 5. *Pieris rapae* ventral

60mm



Fig. 6. *Pieris rapae*



Fig. 7. *Pieris rapae*



Fig. 10. *Pieris brassicae* female



Fig. 8. *Pieris rapae*



Fig. 9. *Pieris rapae*



Fig. 11. *Pieris brassicae* male



Fig. 13. *Pontia protodice*



Fig. 14. *Pontia protodice*



Fig. 12. *Pieris brassicae* male ventral



Fig. 15. *Pieris virginiensis*



Fig. 16. *Pieris marginalis*



Fig. 17. *Pieris marginalis* ventral



Fig. 19. *Euchloe olympia*



Fig. 20. *Euchloe* sp.



Fig. 18. *Colias eurytheme*



Fig. 21. *Appias drusilla* male



Fig. 22. *Ascia monuste* female



Fig. 23. *Ascia monuste* male

Key to Screen *Pieris brassicae* Suspects in the United States

1. Forewings 25-35mm; overall shape is as observed in Figs. 3a-d; antennae are clubbed; forewings are creamy pale white to light yellow with dark wing tips that extend down the termen ***P. brassicae* suspect**
- 1'. Forewing length less than or larger than 25-35 mm; overall shape is not as observed Figs. 3a-d; antennae are not clubbed; forewing color not creamy pale white to yellow; or dark wing tips, if present, do not extend down the termen not *P. brassicae*

Citation

Royals, H. R., T. M. Gilligan and S. Passoa. 2016. Screening aid: Large white, *Pieris brassicae* (Linnaeus). Identification Technology Program (ITP), USDA-APHIS-PPQ-S&T, Fort Collins, CO. 4 pp.

References for more information on *P. brassicae* and non-targets

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Acknowledgments

We would like to thank USDA-APHIS-PPQ National Identification Services and the USDA-APHIS-PPQ-S&T Identification Technology Program for support of this work. Funding for this project was provided to H. Royals through section 10007 of the 2014 Farm Bill.