

STATUS OF *PIERIS VIRGINIENSIS* (PIERIDAE) IN NEW YORK STATE

Additional key words: conservation, Brassicaceae.

Since the introduction of the cabbage butterfly, *Pieris rapae* (L.) (Pieridae), into Quebec around 1860 (Scudder 1889), many changes in the distributions and abundances of members of the genus *Pieris* have been observed in northeastern North America. *Pieris rapae* has spread through most of the continent, while *P. oleracea* Harris and *P. virginiensis* Edwards disappeared from many localities. Competition from *P. rapae* was thought to be the cause for the decline of the native species (Scudder 1889, Forbes 1926), but *P. rapae* does not frequent forested habitats and the two native species prefer to remain beneath the forest canopy (Klots 1935, Chew 1981). The likely cause of the decline of the native species was the reduction of forest habitat (Klots 1935, Chew 1981, Cappuccino & Kareiva 1985), possibly exacerbated by the introduction of non-native Brassicaceae which are lethal to larvae (Bowden 1971, Chew 1978) but to ovipositing females are not distinguished from the natural hosts (Chew 1980).

I attempted to clarify the current distribution of *P. virginiensis* in New York State to assess the need for attention by the conservation community. The present distribution and abundance of *P. virginiensis* in New York State is poorly understood, partly due to the long-standing synonymy with *P. oleracea* which is sympatric with *P. virginiensis* in New York State (e.g., Hovanitz 1963, dos Passos 1965, 1966). Historic reports without specimens for verification are not reliable. However, the loss of well-known *P. virginiensis* colonies and a paucity of modern reports are seen as symptoms of a general decline within New York State (Forbes 1926, Shapiro 1974). Similar concerns in Ontario proved unwarranted after previously unknown populations were located in the 1980s (Layberry et al. 1998).

I searched the literature for historic (before 1974) and recent (1974–1999) reports of *P. virginiensis* within New York State. The dividing point between “historic” and “recent” was based on reports that Shapiro (1974) would have been aware of. In addition to the literature, the collections at the New York State Museum and Cornell University were examined, the New York Natural Heritage Program database was consulted, and localities with appropriate habitat were visited during the flight periods in 1998–1999.

Pieris virginiensis is broadly distributed in New York (Fig. 1), having been documented from 28 counties. Recent accounts were found from 12 counties and historic accounts were found from 22 counties. During field surveys I encountered the species at 12 localities within 7

counties. Five recent localities were documented in the News of the Lepidopterists' Society Season Summary (1974, 1977, 1987, 1997). Two recent reports were found in the New York Natural Heritage Program database. Sixteen counties have reports dating only from before 1974, while six have strictly recent accounts. Only two localities have reports dating from both time periods.

Localities in which I searched forested habitat for populations included areas in the vicinity of historic records and areas near localities where I found extant populations. Regions from which historic documentation of the species exists but where I did not locate extant populations were the southern Catskill Mts. in Sullivan and Ulster Counties, and the area around Trenton Falls in both Oneida and Herkimer Counties. Extensive deciduous forest remains in these areas, but most of the potential habitat is inaccessible. I did not search in the eastern portions of the Catskill Mountains or the western counties.

The narrow overlap of historic and recent accounts of *P. virginiensis* within New York State suggests that the information available is insufficient to elucidate changes in distribution. Newly discovered localities on the Tug Hill Plateau and central and western counties do not necessarily represent newly colonized habitat. The presence of *P. virginiensis* in southern Ontario and one historic specimen from Potsdam (St. Lawrence County, New York) (Shapiro 1974) suggest the species has gone unnoticed in the Tug Hill region

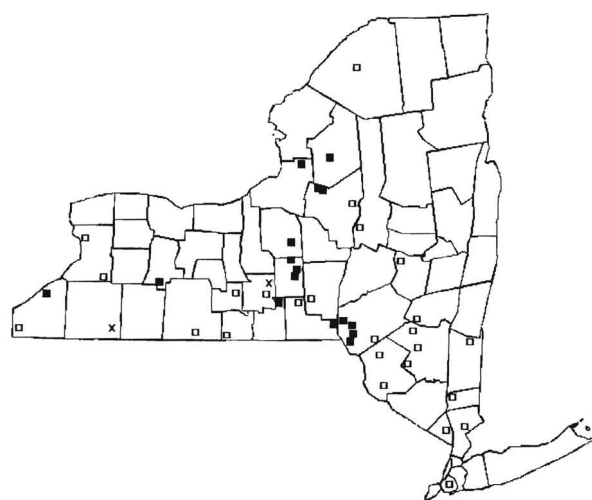


FIG. 1. Map of New York State showing old (before 1974) and recent (1974–1999) collection localities for *Pieris virginiensis* (open square, old; solid square, recent; x, both time periods).

until my explicit attempts to locate it there. The possibility also exists that historic records of *P. oleracea* included individuals of *P. virginiensis*, although all specimens I have seen were correctly identified.

Populations in western counties may also have long escaped notice. *Pieris virginiensis* was last reported from the Buffalo metropolitan area in 1873 (Forbes 1926), but has recently been found in adjacent Chautauqua County (Season Summary 1987). Reports from the vicinity of Olean in Cattaraugus County spans both time periods considered here (Shapiro 1974, Season Summary 1993) but could have included an extirpation followed by recolonization, as was documented in McLean Bog (R. Dirig, Season Summary 1974).

The possibility also exists that *P. virginiensis* populations have shifted hosts and are moving into areas previously unoccupied. Courant et al. (1994) and Porter (1994) discussed the strong selective pressures associated with the use of non-native Brassicaceae by native pierines. Porter (1994) presented three possible outcomes for a population encountering the spread of non-native Brassicaceae, including the initial decline of the native *Pieris* population as the lethal effects of the new host remove individuals feeding on the lethal host, followed by an increase due to two potential responses. Selection would favor females that recognize the lethal host and refuse to oviposit, or selection would favor larvae capable of utilizing the new host. The third outcome would be loss of populations as the non-native, lethal host expands its range and dominance across the landscape. The host association of populations at most of the localities in which I found *P. virginiensis* could not be ascertained. All sites where large colonies were found were associated with native *Dentaria*. The relationship between *P. virginiensis* and the native and non-native Brassicaceae continues to be a question requiring research. The populations in and around Tompkins and Cortland Counties, which include the recolonized McLean Bog, may offer an arena for such observation.

The loss of forest continues to be the greatest threat to the viability of *P. virginiensis* populations. Historic extirpations typically have been noted in areas of urban expansion. Colonies are occasionally found in woodlands within suburban areas. These habitats are more suitable to *P. rapae*, but the responses of native *Pieris* species to habitat conversion are not understood.

Although *P. virginiensis* is likely less common than in the past (Cappuccino & Kareiva 1985), it remains in many forested areas throughout New York State. However, no conclusion regarding its long-term viability can be made until additional information on the population dynamics within a series of localities in New York State is gathered. The number of unknown populations I found

during only a few days within two flight seasons indicates that additional surveys will find this species more widespread than is made apparent by the distribution map included here (Fig. 1), particularly in the Catskill Mountains and the vicinity of Allegany State Park. Additional survey efforts should also be given to localities with historic documentation but lack recent specimens.

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