

## THE SOUTHERN LIMITS OF THE RANGE OF *PIERIS NAPI* AND *P. VIRGINIENSIS*

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HOVANITZ (1962, 1963) has reviewed and discussed the distribution of the species of *Pieris* in North America and the relation of *P. virginiensis* Edwards to *P. napi* Linnaeus. This note reviews some of the literature on the southern limits of these species, comments on the reported occurrence of *P. virginiensis* in eastern Colorado; its probable occurrence in Mississippi; and on the reported occurrence of *P. napi* at Waco, Texas and in the "northern limits of the Gulf States."

Klots (1951) wrote: "Until very recently, *virginiensis* has been confused with *napi*, but it is now known to be a distinct species of more southern (Transition Zone) distribution. . . Old records are unreliable since Scudder, Edwards, etc. confused this species with *napi*." He gave the range of *napi* as: "Canadian Zone of northern United States and Canada, w. to the Pacific. . . Not recorded s. of the Catskill Mountains in New York" and of *virginiensis* as: "Transition Zone, Ontario, central New England and New York, s. to Virginia (TL. Kanawha, W. Va.)." Since he also stated: "True Canadian Zone runs far southward at high elevations along the Appalachians, not, of course, in a continuous strip. It is thus recognizable as far south as Georgia." He clearly implied that the southern limit of the known range of *napi* is far north of the southern limit of areas recognizable as true Canadian Zone.

Holland (1931), included *virginiensis* as a form of *napi*, and stated that *napi* "ranges from the Atlantic to the Pacific and from Alaska to the northern limits of the Gulf States." If Alabama is considered as a "Gulf State" then its northern limit near Chattanooga may be regarded as including Transition or even Canadian Zone elements similar to those in what Harris (1950) has designated the "mountain region" of north Georgia. Clark (1932) stated that *P. virginiensis* occurred in the highlands to North Carolina and quoted W. T. M. Forbes to the effect that his most northern record of *virginiensis* was the southern slope of the Adirondacks while he had no *P. napi* records south of the Mohawk Valley. Forbes (1960) wrote that *P. napi* had the range: "Western Massachusetts and northern

New York to Colorado and north;" and that *P. virginiensis* had the range: "from Quebec to Massachusetts and West Virginia, west to Michigan." Tietz (1952) had no *napi* records from Pennsylvania, and *virginiensis* records only from the Austral Zone (Allegheny Co.). His map shows the northern portion of Allegheny Co. as Transition Zone. Clench (1958) found *virginiensis* common at the Powdermill Nature Reserve in eastern Westmoreland Co., an area that appears to include both Canadian Zone and Transition Zone elements.

Harris (1950) did not mention *virginiensis* as known or probable for Georgia. Remington is quoted in Mather and Mather (1958) as having written that *virginiensis* is locally common in Tennessee and Lindsley (1960) reported it has having been found "in fair numbers" on 22 April 1959 in the Great Smoky Mountain National Park, Tenn. Field (1940) did not mention *virginiensis* or *napi* as possible for Kansas. Martin and Truxal (1955) reported specimens of *virginiensis* from Michigan, Minnesota, and Wisconsin; and of *napi* from Arizona, New Mexico, Utah, Colorado, Wyoming, and states north and west thereof. Remington (1952) reported observations of oviposition by *napi* at several Colorado localities. Brown, Eff, and Rotger (1956) described the occurrence of *napi* in Colorado and noted that it is rarely found below 9000 ft. above sea level. Brown, Eff, and Rotger (1957) also discussed the report by Cross (1937) that *virginiensis* "occurs on our eastern plains" and stated "This is impossible" adding "I cannot imagine what species Cross confused with this one." DeFoliart (1956) gave records of *napi* from southeastern Wyoming and Elrod (1906) gave records from Montana. Remington (1954) gave the name *macdunnoughii* to the race of *napi* found in Colorado, Utah, Nevada, and Wyoming.

Voss and Wagner (1956) discussed the occurrence of both *napi* and *virginiensis* in Michigan. They gave the range of *virginiensis* as "from Ontario, New England, and New York, southward to North Carolina." Reinthal (1956) discussed the occurrence of *virginiensis* in Connecticut and Massachusetts. Both Voss and Wagner, and Reinthal describe localities in Michigan and Massachusetts, respectively, at which both species were found flying together. Simmons (1956) described the occurrence of *virginiensis* in Maryland. Macy and Shepard (1941) make no mention of *virginiensis* and state that in Minnesota *napi* "occurs almost exclusively in the northern part of the state."

Gooch and Strecker (1924) discussed the butterflies of the vicinity of Waco, Texas. They stated that the majority of the

butterflies were collected between 1904 and 1908. "In 1905, a series of duplicates were presented to the Carnegie Museum of Pittsburgh, Penna., and we are indebted to Dr. W. J. Holland for the positive identification of many of the smaller species." Three species of *Pieris* were listed: "*P. protodice*: abundant; *P. rapae*: very common; and *P. napi*: 'The 'Butterfly Book' gives the range of this species as 'from the Atlantic to the Pacific, and from Alaska to the northern limits of the Gulf States' Waco specimens of this butterfly were sent to Dr. Holland and he identified them as *napi*. It is rather common." Mr. H. A. Freeman wrote (*in litt*) "I don't have any idea as to what they could have been calling *Pieris napi* from down this way, as it certainly has not been collected around here since I have lived in the state. Bel-fraghe most likely made the collections and some of his material is in the Carnegie Museum." Mr. H. K. Clench wrote (*in litt*) "I have given the collection a careful going over, and can find nothing at all among all the *napi* and *virginiensis* labelled as from Waco, Texas or anywhere near there. I cannot imagine what Holland could have mistaken for *napi*."

From these data and comments it would appear that the range of *P. napi* in the United States includes most of the New England states, New York state south to the Catskills and Adirondacks, northern Michigan, northern Minnesota, the Rocky Mountains in Wyoming, Montana, Colorado, New Mexico, and westward through Arizona, Utah, and Nevada to California and the Pacific northwest. *P. virginiensis* generally occurs downhill or down range from *napi* but the southern range of *napi* overlaps the northern range of *virginiensis* at least in some places such as Massachusetts and Michigan. The southern limit of the range of *virginiensis* appears to be reached in the Appalachian mountains of west Tennessee and eastern North Carolina, the western part of Pennsylvania, and central Michigan. Data appear to be lacking as to the possible westward extension of the range of *P. virginiensis* bordering the southern or eastern edge of the range of *napi* into Wisconsin and Minnesota and along the front of the Rocky Mountains. The reported occurrence of *virginiensis* downhill from the range of *napi* in eastern Colorado was regarded as "impossible" by those who have most recently studied the distribution of Colorado butterflies. It also appears to be impossible to determine the basis on which *napi* (or *virginiensis*) was reported to occur at Waco, in central Texas; or "to the northern limits of the Gulf States." These latter reports formed the basis on which Mather and Mather (1958) reported *vir-*

*giniensis* as possible but not likely for Mississippi. From the present review, *virginiensis* would appear impossible of occurrence in Mississippi.

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