

***SITONA LINEATUS* (L.), THE PEA LEAF WEEVIL:
FIRST RECORDS IN EASTERN NORTH AMERICA
(COLEOPTERA: CURCULIONIDAE)**

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Abstract.—The pea leaf weevil, *Sitona lineatus* (L.), a common pest of legumes in Europe, has been known from the Pacific Northwest (British Columbia, California, Idaho, Oregon, and Washington) since the mid 1930's. Recent collections from Virginia (Cheriton, Northampton Co. and Newport News) indicate that *S. lineatus* is established in eastern North America. North American interception records, host plants, economic importance, seasonal history, and habits are summarized for populations in Europe and the Pacific Northwest. An adult diagnosis and habitus allow separation of *S. lineatus* from the clover root curculio, *S. hispidulus* (F.), and other *Sitona* species known to occur in eastern North America.

Sitona lineatus (L.), a well-known pest of leguminous crops, is widely distributed through Europe (including the British Isles) and northern Africa (Morocco). In North America it is known from the Pacific Northwest. It was first detected in North America in 1936 when specimens were taken under codling moth bands at Royal Oak near Victoria, Vancouver Island, British Columbia (Downes, 1938). *S. lineatus* is now widespread in the coastal regions west of the Cascade mountain range in Oregon (Willamette River Valley) and Washington, and reaches the western end of the Fraser River Valley in British Columbia (Prescott and Reeher, 1961); it also occurs in central and northern California and northern Idaho (see map in U.S. Dept. Agric., 1970:58).

We provide here the first records of this introduced weevil in eastern North America (Virginia); review North American interception data for the species; summarize what is known of its food plants, habits, and seasonal history; and give characters for separating it from native and introduced species of *Sitona* occurring in eastern North America.

Detection.—A recent collecting trip by the authors to the Tidewater area and the Eastern Shore of Virginia produced the first confirmed records of the pea leaf weevil, *S. lineatus* (L.), in eastern North America. Specimens were swept from vegetation along railroad tracks at two sites in coastal Virginia: Northampton County, Cheriton, 26 May 1984, E. R. Hoebeke and A. G. Wheeler, Jr., colls.; Newport News, 26 May 1984, ERH and AGW. On a second trip to the Cheriton site, on 2 June 1984, AGW collected 74 specimens from hairy vetch (*Vicia villosa* Roth).

Interception records.—Each year from 1940 to 1963, specimens of *S. lineatus* were intercepted at ports of entry along the eastern seaboard. These records are from List of Intercepted Plant Pests, 1940–1963, compiled by the U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine programs. Most specimens apparently were associated with cut flowers originating from the Netherlands, Denmark, England, Germany, and Bermuda, and destined for New York, New Jersey, Pennsylvania, and Massachusetts.

The interception records from Bermuda are of particular interest. If *S. lineatus* is established in Bermuda (as the interception data would suggest), this then would be a likely source area of immigration into the mid-Atlantic states, perhaps more so than Europe or the West Coast. The field sites where we collected specimens (railroad right-of-ways and yards) at Cheriton and Newport News are near the expansive naval facilities of the Norfolk area. Reed (1964) listed several exotic weeds of European and South American origin that have been introduced with commerce to the port of Newport News. D. R. Whitehead (Systematic Entomology Laboratory, USDA, Washington, DC) has suggested that the Norfolk area, because of its naval facilities and proximity to Bermuda, might be a plausible (and relatively recent) focus of infestation (*in litt.*).

Host plants and damage.—Plants of the family Fabaceae (= Leguminosae) are the primary hosts of adult *S. lineatus* and represent the sole food source for the larvae. In the Pacific Northwest, the principal host plants are peas and vetch (Prescott and Reeher, 1961). Adults, however, also will cause severe feeding injury to alfalfa (*Medicago sativa* L.) and red clover (*Trifolium pratense* L.). In Great Britain, the food plants include peas, broadbeans, alfalfa, black medic (*Medicago lupulina* L.), all species of clover, tare (*Vicia sativa* L.), and wild vetches (*Vicia* spp.) (Jackson, 1920). When the principal leguminous food plant is in limited abundance, adults may feed on plants in various families (see Prescott and Reeher, 1961).

Adult feeding damage is characteristic, consisting of subcircular or U-shaped notches in the leaf margins, cut in close sequence and producing a scalloped effect (Prescott and Reeher, 1961). Severe ragging of the leaves or complete defoliation can occur in heavy infestations. Although the most obvious injury is done by the adults, larvae can severely damage and destroy the nitrogen root nodules of peas and vetch.

Seasonal history and habits.—In Europe, the biology of *S. lineatus* has been well studied and documented by several workers, including Andersen (1931) and Hans (1959). The seasonal history outlined below is drawn largely from Prescott and Reeher's (1961) studies in the Pacific Northwest, and Jackson's (1920) studies in Great Britain. Because of the relatively moderate climate of the coastal region of the Pacific Northwest, both the weevil and host plants develop 1–2 months earlier than in Great Britain and Europe.

Adults leave their overwintering sites and usually start flying about the middle of March in the Pacific Northwest, as temperatures approach 60°F, and move rapidly onto leguminous crops. By mid-March, adults have mated and begun laying eggs. Eggs are generally scattered singly on the soil surface near hosts but occasionally are laid on the plants. Females are capable of depositing large numbers of eggs over an extended period. Eggs begin hatching in mid- to late April and continue to hatch into late June. Newly hatched larvae move through the soil and

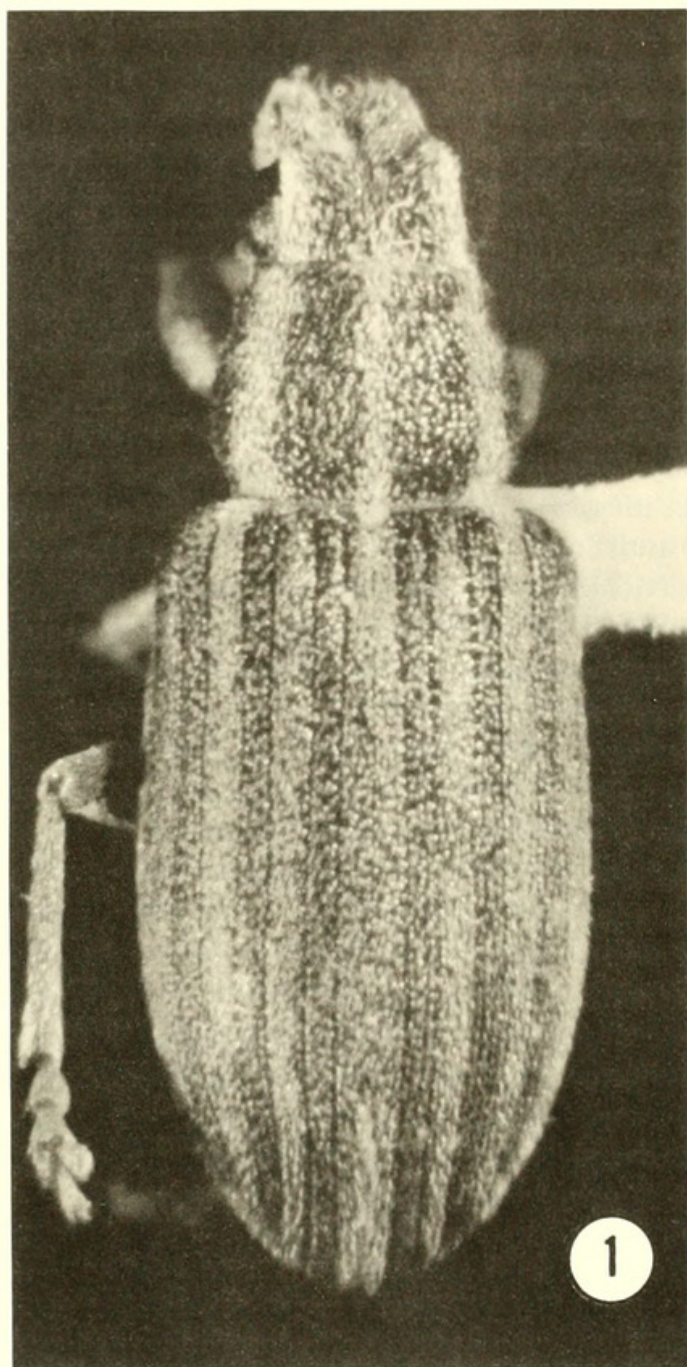


Fig. 1. *Sitona lineatus* (L.), the pea leaf weevil. Adult habitus, dorsal.

make contact with root nodules of the host plant. Young larvae feed on nodules by chewing a hole through one end and consuming the contents. In Europe, it has been noted that larvae also will feed on roots (Baranov, 1914). Mature larvae vacate the nodules and pupate in the soil. By early June, new adults begin to emerge from the soil, reaching peak levels from late June to mid-July. New adults fly intensively for several weeks, then disperse widely in search of alfalfa and red clover. From late summer through most of the fall, new adults enter a period of estivation, seeking refuge among roadside litter, grass clumps, and fence rows. In the Pacific Northwest, weevils become active again by mid-October and resume feeding on legumes.

In North America, there is one generation annually (Prescott and Reeher, 1961).

The newly emerged, sexually immature, adults do not begin to lay eggs until the following spring (Jackson, 1920). In Europe, the number of generations produced annually may vary. Molz and Schröder (1914) recorded 2 generations in Germany, and Rostrup (1915) lists the same in Denmark. In Sweden, Kemner (1917) mentioned only a single generation, as did Baranov (1914) for Russia.

The longevity of overwintered adults is approximately 2–3 months. Duration of the life stages in the Pacific Northwest, according to Prescott and Reeher, 1961, are as follows (numbers in parentheses refer to European populations): egg, 18 days (20–21); larva, 35 days (42–49); and pupa, 15 days (21).

Recognition features.—Adults of *S. lineatus* (Fig. 1) can be readily separated from other *Sitona* species occurring in eastern North America by the following combination of characters: Length 3.9–5.0 mm, form slender, elongate; body (devoid of scales) black, with antennae, tibiae and tarsi brownish red; dorsal scales brownish ochreous or greyish ochreous, interspersed with flat setae; pale scales tending to form median and sublateral stripes on the head and pronotum; scales of the elytra (Fig. 1) frequently arranged in alternate light and dark stripes; rostrum with a central furrow extending behind level of hind margin of eyes; and anterior margin of procoxae very narrowly or not at all separated from the transverse subapical furrow that traverses the ventral surface of the prothorax.

Larvae of *S. lineatus* have been described and illustrated in detail by Jackson (1920) and van Emden (1952). Prescott and Anderson (1961) gave characters and illustrations by which *S. lineatus* can be separated from the clover root curculio, *S. hispidulus*.

ACKNOWLEDGMENTS

The authors express their gratitude to D. R. Whitehead (Systematic Entomology Laboratory, IIBIII, USDA, Washington, D.C.) for confirming the identification of *S. lineatus*, and for sharing ideas about the possible means of introduction of this weevil. We are also grateful to R. D. Sale and J. F. Stimmel (Penn. Dept. of Agric., Harrisburg, PA) for the photograph of the adult habitus, and to R. J. Hill (PDA) for identifying the host plant, *Vicia villosa*.

LITERATURE CITED

- Andersen, K. T. 1931. Der linierte Graurüssler oder Blattrandkäfer (*Sitona lineata* L.). Monogr. Pflanzenschutz 6: 1–88. (In German.)
- Baranov, A. D. 1914. Pests of field crops. Materials for the study of the injurious insects of the government of Moscow. Moscow, V, 112–130. (In Russian.)
- Downes, W. 1938. The occurrence of *Sitona lineatus* L. in British Columbia. Can. Entomol. 70: 22.
- Hans, H. 1959. Beiträge zur Biologie von *Sitona lineatus* L. Z. Angew. Entomol. 44(4): 343–386. (In German.)
- Kemner, N. A. 1917. Ärtviveln (*Sitona lineatus* L.). Centralanstalten för Jordbruksförsök, Flygblad Nr. 63. (In Swedish.)
- Jackson, D. J. 1920. Bionomics of weevils of the genus *Sitones* injurious to leguminous crops in Britain. Ann. Appl. Biol. 7: 269–298.
- Molz, E. and D. Schröder. 1914. The life cycle of *Sitona lineata* in Germany. Z. wiss. Insektenbiol., Berlin, X, nos. 8–9, pp. 273–275. (In German.)
- Prescott, H. W. and W. H. Anderson. 1961. Characters for separating larvae of *Sitona lineata* (L.) and *Sitona hispidula* (Coleoptera: Curculionidae). Ann. Entomol. Soc. Am. 54: 465–466.
- Prescott, H. W. and M. H. Reeher. 1961. The pea leaf weevil, an introduced pest of legumes in the Pacific Northwest. U.S. Dept. Agric. Tech. Bull. 1233. 12 pp.
- Reed, C. F. 1964. A flora of the chrome and manganese ore piles at Canton, in the Port of Baltimore,

- Maryland and at Newport News, Virginia, with descriptions of genera and species new to the flora of eastern United States. *Phytologia* 10: 321-406.
- Rostrup, S. 1915. Some observations concerning *Sitona lineatus*. *Entomol. Medd. Entomol. Foren.*, X, 6, pp. 258-259. (In Danish.)
- U.S. Dept. Agric. 1970. Distribution of Pea Leaf Weevil (*Sitona lineatus*). *Coop. Econ. Ins. Rpt.* 20(5): 58.
- van Emden, F. I. 1952. On the taxonomy of Rhynchophora larvae: Adelognatha and Alophinae. *Proc. Zool. Soc. Lond.* 122: 651-795.



Hoebeke, E R and Wheeler, A. G. 1985. "Sitona lineatus (L.) the pea leaf weevil: first records in Eastern North America (Coleoptera: Curculionidae)."
Proceedings of the Entomological Society of Washington 87, 216–220.

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