

leaving no air space. This cannot be done in the ordinary manner because of air resistance in the neck of the vial.

The method described above, possibly well known to many, has given the author a much kinder feeling towards collections in alcohol. It is hoped that it may prove of value to others, who may include among their duties the care of material preserved in liquids in sealed vials.

**THE OCCURRENCE OF THE CLAY-COLOURED WEEVIL,
(*Brachyrhinus singularis* (L)) IN BRITISH COLUMBIA (Coleoptera) ***

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In April 1937 our attention was called to the severe damage to Portugal laurel growing adjacent to the horticulture building at the Exhibition grounds at Victoria, B. C. On examining the laurel trees, weevils unknown to the writer were found seriously injuring the foliage. Specimens were identified by Mr. W. J. Brown, Division of Entomology, Ottawa, as *Brachyrhinus singularis* (L), known in Britain as the "clay-coloured weevil." To our knowledge this is the first record of this weevil occurring as an economic pest in British Columbia.

The adult is a nocturnal, wingless beetle, oblong-oval in shape, 6 to 8 mm. long, and closely covered with brown and pale yellowish-brown scales, giving it a speckled appearance. Being frequently covered with particles of earth it is very difficult to detect on the soil, especially as it often feigns death when disturbed.

Early History in North America :— In correspondence with Mr. Brown, and from his recent paper in the *Canadian Entomologist* (2) we learned that the clay-coloured weevil was found in Canada as early as 1902 at Montreal, Que., and has since been collected at Lauzon, Que.; Guelph, Ont.; Yarmouth and Halifax Counties, N. S.; and Charlotte County, N. B. In the United States it occurs at Stoneham and Essex, Mass., the latter place being the first record for North America where it was reported under the name of *Brachyrhinus picipes* Fab. in 1872.

Host Plants and Distribution :— There are few published records of the occurrence of this species of weevil and it seems to be scarce or local in North America. The genus *Brachyrhinus* is distinctly European in origin and it is possible that in Canada the eastern and Victoria specimens are from separate introductions.

During the past four seasons this pest has been observed causing damage to a wide variety of plants, namely, roses, holly, campanula, iris, shasta daisy, viola, hyacinths and blackberry. In Europe, it is also considered to be an important pest of trees and small fruits. In England, Massee (4) and

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Theobald (5) report that considerable damage has been done to raspberry, apple, strawberry and, to a lesser extent, black currant, loganberry, grape, plum and hops. According to Theobald (5) it often occurs in destructive hordes in Kent, Worcestershire, Gloucestershire and most other fruit growing districts in England. In Germany, Kaven (3) reports it as a pest of rhododendron.

Injury :— The damage done by the weevils is varied. The larvae are very destructive to the roots of the plants. The adults feed on the leaves producing a characteristic “ragging” effect in much the same manner as do *Brachyrhinus ovatus* (L) and *B. sulcatus* Fab. The feeding of *B. singularis* however, is much more extensive and at times the foliage is completely stripped. Injury of this kind is not confined to the new succulent leaves; old leaves and the old leaf stems are sometimes eaten.

In England the adult causes damage by attacking the scions of newly grafted apple trees and damaging apple stocks in the nursery beds. It is very partial to young grafts, which it frequently kills by destroying the buds, leaving the graft “blind.” It also gnaws the bark of young apple growth, completely girdling the stems in a very characteristic manner—a type of destruction which we have observed on roses at Victoria. It is an important raspberry insect in England (4) where, if it is left undisturbed in the same fields for many years, it causes a large amount of damage. Most of the injury to raspberry and other cane fruits is done in the spring when the weevil attacks the blossoms and the undeveloped fruit buds. Large areas of fruiting canes are destroyed in this way.

Life History and Habits :— Although not studied in detail the life history of the clay-coloured weevil at Victoria appears to be very similar to that of the strawberry root weevil *B. ovatus*, though emergence is somewhat earlier. The adults come from the soil during the latter part of March and start to feed at once.

Eggs are laid in the soil during the late spring and summer months; on hatching, the legless larvae feed upon the roots of the various plants. The grubs are dull white to creamy-yellow in colour, curved, with a much wrinkled skin which is slightly hairy. They pass the winter in a half to full-grown condition and form the pupal cell in March. Variations in the seasonal history occur, as in the case of *B. ovatus* and *B. sulcatus*. Some adults of *B. singularis* that emerge in the spring do not complete ovipositing by September, but overwinter as adults; they become active the following spring, and continue to lay eggs during the summer.

Light soils are especially favorable to the development of the weevil, but according to the literature studied it has frequently been known to attack plants grown on clay land. One important thing has been noticed, namely, that if it occurs in numbers one year it is sure to be many times more numerous next year and unless steps are taken to control an infestation serious losses will result. This point was clearly demonstrated by periodically examining infested holly trees in an old neglected orchard on Vancouver Island. Within three years the population of weevils became extremely high. By giving the trees a sudden jar the weevils could be dislodged from their daytime hiding places among the holly shoots, and as many as 616 were

collected on a canvas sheet spread on the ground beneath a holly tree 10 feet high. Some idea of the larval population was gained by digging in that area during February of this year (1941) when 50 to 60 larvae per cubic foot of soil were found in some parts of the orchard. The rapid increase or high population potential is largely explained by the fact that the weevils are parthenogenetic.

Control :— Where grafts are subject to attack on standard trees the control of this flightless weevil is simple; it is sufficient to grease-band the tree trunks. On bush trees and apple stocks the pest can be completely controlled by painting the grafts with arsenate of lead paste, applied with a brush. The paint must be applied soon after the grafts are tied, because the weevils feed quickly, and comparatively few will destroy numbers of grafts in a short time.

When the weevils persist in plantations of raspberries, strawberries, holly, etc., it is advisable to cultivate the ground thoroughly in March to disturb the pupae and newly formed weevils, and to spray the foliage with lead arsenate.

Experiments conducted at the Victoria laboratory during 1938 showed that an apple pomace bait containing 5 per cent sodium fluosilicate was highly successful as a control against the adults.

References

1. **Blatchley, W. S. and Leng, C. W.** 1916. Rhynchophora or weevils of North Eastern America. Nature Pub. Co., Indianapolis. Pp. 1-682. (**B. singularis**, p. 112).
2. **Brown, W. J.** 1940. Notes on the American distribution of some species of Coleoptera common to the European and North American continents. Canadian Ent. 72 (4): 65-78. (**B. singularis** p. 76).
3. **Kaven, G.** 1934. Krankheiten und Schadlinge an Rhododendren. Kranke Pflanze, 11 (10): 123-126. See Review of Applied Ent. 22 (Ser. A, Pt. 12): 724, December 1934. (**B. singularis** attacking Rhododendron in Germany).
4. **Masse, A. M.** 1937. The pests of fruits and hops. Crosby Lockwood and Sons, Ltd., Stationers' Hall Court, London, E. C. 4. Pp. 1-500. (**B. singularis**, Pp. 23, 200.)
5. **Theobald, F. V.** 1909. The insect and other allied pests of orchard, bush and hothouse fruits and their prevention and treatment. London. Pp. xvi and 550. (**B. singularis**, pp. 425-427).

TWO UNUSUAL LARVAL HABITATS OF TABANIDS (Diptera)

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All the records I can find of larval habitats of tabanids (Horse flies) state that the larvae are aquatic or semi-aquatic. A. E. Cameron, in his "Bionomics of the Tabanidae (Diptera) of the Canadian Prairie" states, on page 14, "Lutz (1922) who has made extensive studies of the *Tabanidae* of Brazil, argues that because he has not observed oviposition on plants, the eggs may possibly be laid on the ground or in other places where they are not apparent. So far as the *Tabanidae* of the prairie are concerned, this