

Exallonyx philonthiphagus, a New Proctotrypid Wasp in Hawaii, and Its Host

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Exallonyx philonthiphagus n. sp. (Plate 14, figs. 1-4.)

♀. Length to end of ovipositor 5.10 mm. Black; tegulae yellowish brown, mandibles brown, dark at base and near apex, labrum, legs, except apex of femora and of coxae, and trochanters in part, light brown, femora otherwise rather dark brown; antennae dark brown (appearing paler in a specimen preserved in spirits), scape darkest, pedicel and first flagellar joint palest; stigma smoky brown. Head, from above, subquadrate, somewhat wider than long; smooth and polished, with pale pile, eyes sparsely pilose, distant from the posterior margin of the head by about their longer diameter, ocelli forming a rather low triangle, malar space about equal to shorter diameter of eye; frons carinate between the insertion of the antennae, anterior margin of clypeus very slightly emarginate, mandibles simple, third joint of labial palpi broadened and obliquely subtruncate at apex; antennae rather stout, a very little longer than head + thorax; 13-jointed, first two flagellar joints subequal, the first about twice as long as its greatest diameter, subsequent joints to 13th, becoming shorter and more rounded, 13th joint subacuminate at tip and at least half again as long as the 12th or penultimate. Thorax: neck transversely carinulate above and at sides, mesothorax narrowed in front, the sides concave; scutum smooth and polished, impression at base of scutellum deep; metanotum foveate; pro- and mesopleurae smooth and polished, posterior margin of mesopleurae foveate; metapleurae strongly reticulate. Propodeum: a broad smooth space on each side of the median carina, passing over into strongly reticulate sculpture behind and at the sides; femora stout, the anterior ones particularly so, longer metatibial spur less than half as long as the metatarsus. Wings clear; costal, subcostal and submarginal veins brown; stigma brown; marginal cell a little more than half as long as stigma, other venation represented by glassy folds or ridges. Abdomen: petiole, above, broader than long, its basal angles prominent, the apical end rounded-angulate; sculpture rather coarse and irregular; beneath transversely wrinkled except apically, where it is longitudinally parallel-grooved; longitudinal grooves at base of abdomen above, increasing in length mesially. Ovipositor finely longitudinally aciculate, hardly as long as the hind metatarsus.

Type, ♀, and 1 ♀ paratype (lacking part of abdomen and wings); and a ♂ and ♀ pupa, all in the collection of the Experiment Station, Hawaiian Sugar Planters' Association. A ♀ also deposited with Professor C. T. Brues, Department of Entomology, Harvard University. All were reared from larvae of the staphylinid beetle *Philonthus turbidus* Erichson, secured at Nauhi, Hawaii, 5,250 feet elevation, October, 1931. This wasp, judging from Ashmead's table and description (Monograph of the North

American Proctotrypidae, Bull. 45, U. S. National Museum, p. 335, and pp. 343-344, 1893), and from Brues' table (Jour. New York Entom. Soc., XXVII, pp. 9-11, 1919), is certainly closely related to *Exallonyx quadriceps* (Ashm.) from the Eastern United States and which is apparently a smaller species with slightly paler appendages; it seems also related to the European *Exallonyx ater* (Nees), (see Morley, C. A Synopsis of British Proctotrypidae (Oxyura); The Entomologist, 55, 1922, on pp. 159-160, and 183).

On September 30, 1931, while studying the insects of decayed tree trunks with Mr. O. H. Swezey, at Nauhi Forest Nursery, on the moist slopes of Mauna Kea, Hawaii, at an elevation of 5,250 feet, 6 larvae of the staphylinid beetle *Philonthus turbidus*, each with an *Exallonyx* wasp pupa protruding from its abdomen, were found. The fallen trunk of an *Acacia koa* Gray, from which 5 of the specimens were secured, was much decayed and its hollowed upper surface contained soil-like material besides the disintegrated wood. A near-by log yielded the sixth *Exallonyx*. In some cases, at least, the parasitized *Philonthus* larva lay in a cell. Five of these bore a female wasp pupa, each of which protruded for half its length or more from the venter of its host's abdomen and towards which it could bend the body. The single male pupa protruded somewhat less than one-third its length from the host. The one bearing the male pupa (Fig. 4) had evidently been quite near pupation at the time of attack by the wasp, for its head capsule was split above and below, and the pro- and mesonotum were also cleft, as occurs when the skin is about to be shed to release the pupa. A second parasitized *Philonthus*, likewise with the thoracic plates divided, had the posterior portion of the body hollowed out by the wasp grub, while the anterior portion, little eaten of, enclosed head and thorax, already more or less chitinized, of the next or pupal stage of development. Other parasitized larvae did not show these signs of moulting, but all appeared to have reached their maximum growth. It seems reasonable to suppose, therefore, that *Exallonyx philonthiphagus* attacks only those *Philonthus* larvae that, because of nearness to the quiescent or pupal stage, are comparatively helpless; the feeding *Philonthus* larva is active, carnivorous, and armed with sickle-like jaws and would then seem too strong an antagonist. It is evident that the

Exallonyx larva feeds within the body of its host and when the time for pupation is at hand breaks through the venter and pupates partly extruded—as figured. Here one sees that in the female pupa, the antennae are stretched along the underside of the body (Fig. 1), while in the male they are bent back on the head with somewhat of a ram's horns effect.

The single male pupa, showing signs of dissolution, was preserved in alcohol together with a female pupa. The remaining 4 *Exallonyx* pupae successfully transformed into shining black wasps about 5 millimeters long and with the legs largely brownish. Unfortunately, 2 of these wasps were enclosed in a vial containing a *Philonthus turbidus* pupa, that, hatching into a beetle, mutilated and partly devoured its wasp foes. The pupa of this beetle is comparatively stout, yellowish brown, well chitinized and with the appendages immovable.

Philonthus turbidus (Erichson, W. F., Genera et Species Staphylinorum, Berlin, p. 484, 1839-1840), is widespread in the Hawaiian Islands, and M. Bernhauer and K. Schubert, in W. Junk's Catalog of Coleoptera, Staphylindae, p. 358, 1914, give its world distribution as: Canaries, Madagascar, Hawaii, Morocco, Egypt, Maderia, Syria, and South Russia.

Few hosts of the genus *Exallonyx* appear to be known. In Great Britain, F. W. Frohawk bred 9 individuals of *E. ater* (Nees) from a single larva of *Creophilus maxillosus* (Lec.), a large stout and common staphylinid beetle. The wasps issued from pupae that protruded from the underside of the defunct beetle larva. (Frohawk, *Proctotrypes ater* from larva of *Creophilus maxillosus*, The Entomologist, p. 225, 1886, Fig.). Sharp, in Cambridge Natural History of Insects V, p. 535, 1895, shows in Fig. 352 the "Pupation of *Proctotrypes* sp. in body of a beetle larva," said beetle larva greatly resembling one of the Staphylinidae, and from the underside of which over a dozen of the wasp pupae are protruding. In genera related to *Exallonyx*, the North American *Cryptoserphus obsoletus* (Say) has been reared by Prof. Comstock in 1879 from the larva of *Stelidota strigosa* (Gyll.), a beetle of the family Nitidulidae (See Ashmead Bull. 45, U. S. Nat. Mus., p. 340, 1893); while the European *Paracodrurus apterogynus* (Haliday) has been bred by K. Zolk from the Larva of *Agriotes obscurus* L., an elaterid beetle (Zur Biologie von *Paracodrurus*

apterogynus Halid. Tartu Ülikooli Ent-katsejaama teadaanded Dorpat No. 5, 1924, 10 pp., 6 figs.). It seems probable that this was the wasp species "the destroyer of the wireworm" bred by Wm. Kirby and so recorded in 1859, and by Curtis. (See Morley, *The Entomologist*, p. 55, 1922.)

Several species of the genus *Proctotrypes* in Europe are known to parasitize the larvae of carabid and staphylinid beetles and of certain diptera, while *P. calcar* Haliday has been reared by Newman from the centipede *Liithobius forficatus*, 21 of the wasp pupae protruding from its neutral side (Newman, E., *The Entomologist*, pp. 342-344, 1867). For the classification and data on the biology of European Proctotrypidae, see Claude Morley (*A Synopsis of British Proctotrypidae (Oxyura)*, *The Entomologist*, 55, pp. 1-3, 59-60, 82-83, 108-110, 132-135, 157-161, and 182-186).

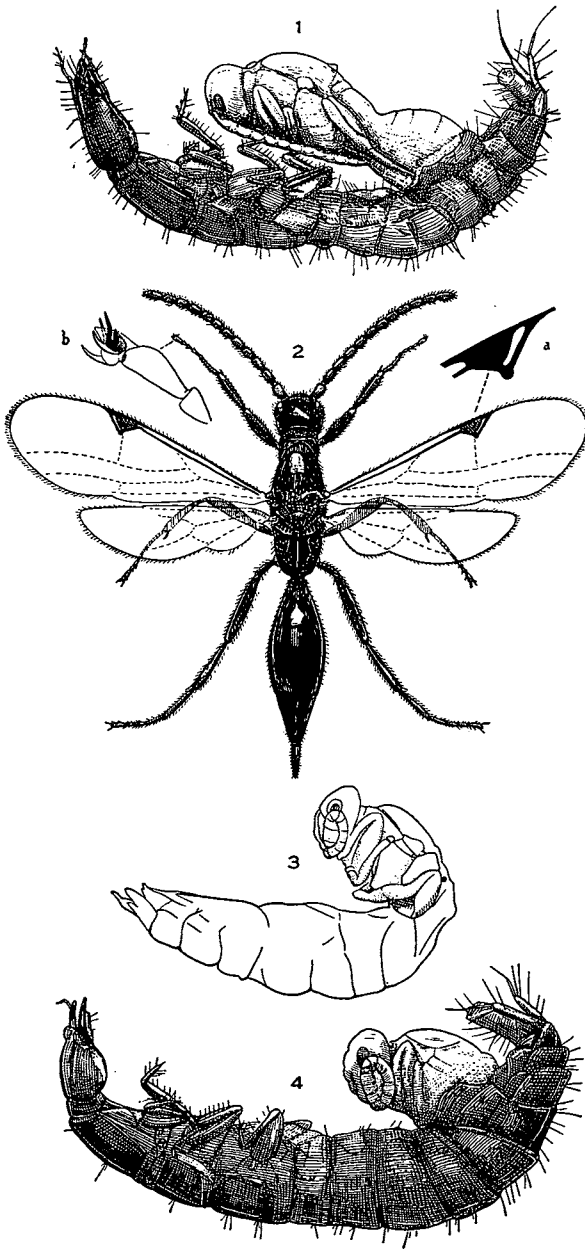
H. Maxwell-Lefroy, *Indian Insect Life*, p. 168, 1909, states that an Indian species of Proctotrypidae was reared from a beetle larva.

Proctotrypes hawaiiensis (Ashmead, *Fauna Hawaiiensis*, I, Pt. 3, pp. 294-295, 1901), a wasp with the head transverse, is the only other proctotrypid recorded from the Hawaiian Islands, where it has been taken by Dr. R. C. L. Perkins and others at suitable elevations in the mountains.

EXPLANATION OF PLATE 14

(All figures enlarged 11 diameters, except 2a and 2b highly enlarged)

1. Larva of the staphylinid beetle, *Philonthus turbidus*; with the female pupa of the wasp *Exallonyx philonthiphagus* protruding from the under-side of its abdomen.
2. Adult wasp, *Exallonyx philonthiphagus* type; female; a, stigma and marginal cell of wing; b, last two tarsal joints and claws of foreleg of paratype.
3. Male pupa of the wasp *Exallonyx philonthiphagus* dissected from body of its host, *Philonthus turbidus*.
4. Larva of *Philonthus turbidus* showing male pupa, of fig. 3, of the wasp in position.



Williams. *Exallonyx philonthiphagus*