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## REDESCRIPTION OF *PHAENOCARPA SEITNERI* FAHRINGER AND NOTES ON ITS BIOLOGY (HYMENOPTERA: BRACONIDAE: ALYSIINAE)

by

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Achterberg, C. van & A. Roques: Redescription of *Phaenocarpa seitneri* Fahringer and notes on its biology (Hymenoptera: Braconidae: Alysiinae).

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Key words: Braconidae; Alysiinae; Alysiini; *Phaenocarpa seitneri*; redescription; biology; hosts; *Lasiomma*; Anthomyiidae; biogeography.

*Phaenocarpa seitneri* Fahringer, 1929 (Braconidae: Alysiina: Alysiini) is redescribed, a lectotype is designated and figured, and notes on its biology are given. In the French Alps *P. seitneri* frequently is a parasite of *Lasiomma melania* Ackland, *L. infrequens* Ackland and *L. laricicola* Karl on European Larch.

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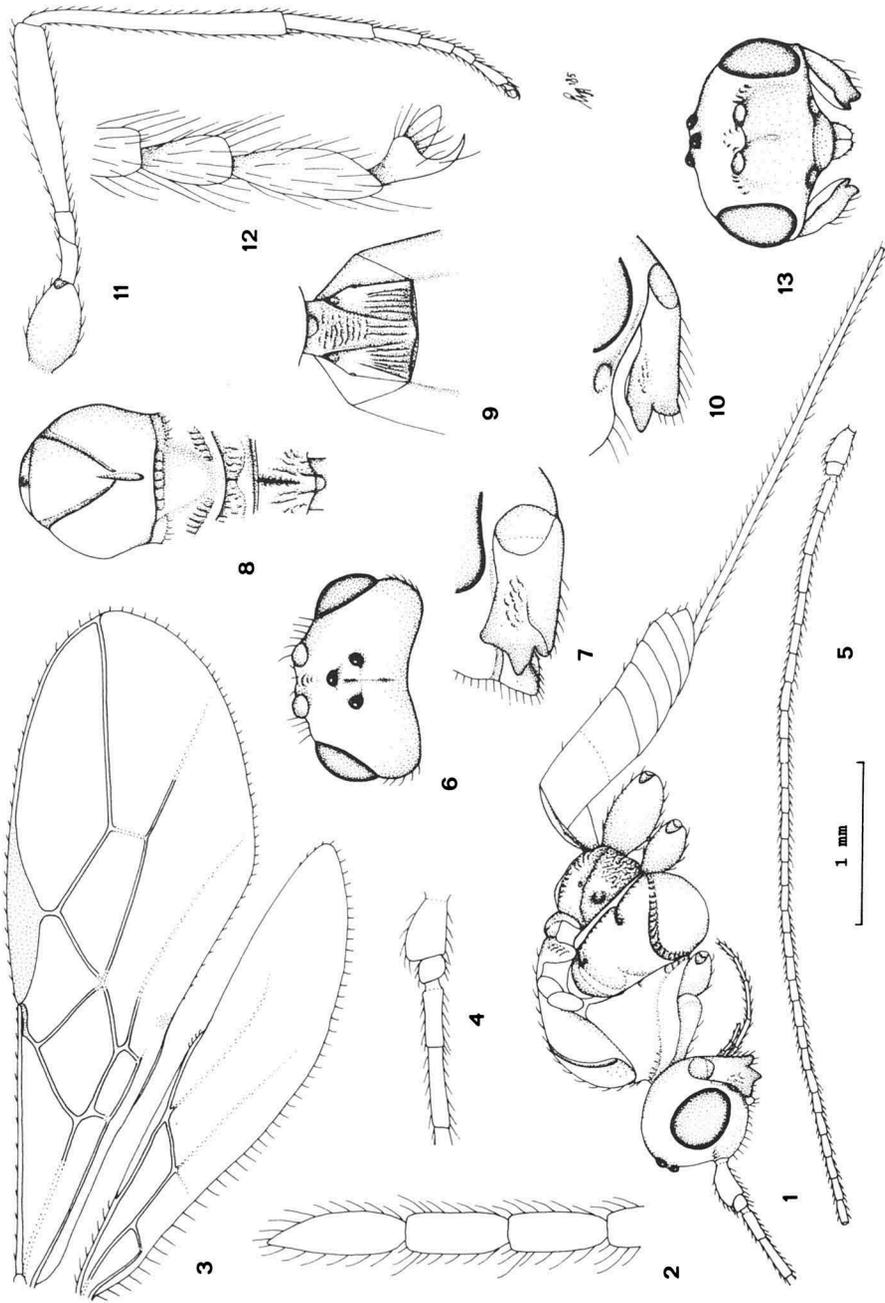
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### REDESCRIPTION

(figs. 1.1-1.13)

*Phaenocarpa seitneri* Fahringer, (in Seitner), 1929: 164-165; Shenefelt, 1974: 1015 (list of literature); Stadnitskii & Grebenshchikova, 1977: 30 (Central Europe; Irkutsk Province).

Note. — This species is redescribed for three reasons: (i) it has never been illustrated, (ii) the redescription by Fischer (1967: 119) did not fit well the



reared series from France (e.g., length of ovipositor sheath, lower position of vein CULa of fore wing, length of vein r in relation to width of pterostigma, and length/width ratio of mandible) and (iii) it takes an intermediate position between the genera *Phaenocarpa* Foerster and *Idiasta* Foerster because of the long vein M + CU of hind and comparatively short vein 3-SR of fore wing. Dr. Max Fischer (Wien) kindly loaned us the two existing type specimens (♀, ♂ in the Vienna Museum; the ♀ is described below.

Lectotype (here designated), ♀, length of body 3.6 mm, of fore wing 4.1 mm.

Head. — Remaining antennal segments 31 (about 38 according to original description), length of 3rd antennal segment 0.8 times 4th segment, slightly wider than 4th segment (fig. 1.4), length of 3rd and 4th segments 3.0 and 4.2 times their width, respectively; length of penultimate segment of ♀ from Briançon 2.4 times its width (fig. 1.2); length of maxillary palp equal to height of head; length of eye in dorsal view 1.5 times temple (fig. 1.6); temple nearly parallel-sided behind eyes, rounded posteriorly (fig. 1.6); POL: diameter of ocellus: OOL = 12 : 5 : 14; vertex convex, smooth and largely glabrous; face rather flat and punctulate (fig. 1.13); anterior tentorial pits large, distance between pit and eye 1.3 times maximum diameter of pit (fig. 1.13); clypeus strongly protruding, with its ventral rim much lower (fig. 1.7); length of malar space 0.2 times basal width of mandible; malar space without suture, only shallowly horizontally impressed (fig. 1.10); mandible widened dorsally (fig. 1.7), with incision between 2nd and 3rd tooth (fig. 1.10), and its medial length 1.6 times its maximum width.

Mesosoma. — Length of mesosoma 1.2 times its height; pronope medium-sized and round (fig. 1.8); antescutal depression indistinct: side of pronotum smooth, except for some crenulae anteriorly (fig. 1.1); precoxal sulcus complete and distinctly crenulate, but shallow posteriorly (fig. 1.1); pleural sulcus finely crenulated (fig. 1.1); episternal scrobe deep (fig. 1.1); metapleural flange small; metapleuron rug(ul)ose ventrally, smooth dorsally, and with large, deep pit (fig. 1.1); notauli complete, smooth, and narrowed posteriorly (fig. 1.8); medio-posterior depression of mesoscutum deep and slender droplet-shaped (fig. 1.8); mesoscutal lobes largely glabrous and smooth; scutellar sulcus comparatively narrow finely crenulate, its length about 5 times

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Fig. 1. *Phaenocarpa seitneri* Fahringer, ♀, holotype, but 1.2 and 1.11 of ♀, France, Briançon. 1.1, habitus, lateral aspect; 1.2, apex of antenna; 1.3, wings; 1.4, base of antenna; 1.5, antenna; 1.6, head, dorsal aspect; 1.7, mandible, full sight on first tooth; 1.8, metasoma, dorsal aspect; 1.9, first metasomal tergite, dorsal aspect; 1.10, mandible, full sight on third tooth; 1.11, hind leg; 1.12, outer middle claw; 1.13, head frontal aspect. 1.1, 1.3, 1.5, 1.11: scale-line (= 1×); 1.2, 1.12: 4.7×; 1.4, 1.7, 1.10: 2×; 1.6, 1.8, 1.9, 1.13: 1.3×.

its width (fig. 1.8); scutellum rather flat, glabrous and smooth; metanotum with short medial carina (fig. 1.8), slightly protruding (fig. 1.1); surface of propodeum smooth anteriorly (except some crenulae near medial carina (fig. 1.8)), medio-posteriorly largely rugose, laterally smooth; medial carina of propodeum present in anterior 0.7; propodeal spiracle small and in front of middle of propodeum.

Wings. — Fore wing: r behind middle of pterostigma and about 1/3 width of pterostigma (fig. 1.3); r : 3-SR : SR1 = 5 : 38 : 80; 1-SR + M and SR1 straight; 1-CU1 : 2-CU1 = 5 : 24; BU1b long vertical, longer than 3-CU1 (fig. 1.3); CU1a below level of 2-CU1 (fig. 1.3); 2-SR : 3-SR : r-m = 16 : 19 : 7; m-cu interstitial, converging to 1-M posteriorly. Hind wing: M + CU : 1-M = 15 : 13.

Legs. — Hind coxa smooth; tarsal claws moderately robust (fig. 1.12); hind leg missing, but length of femur, tibia and basitarsus of ♀ from Briançon 5, 11.4, and 5.4 times their width, respectively.

Metasoma. — Length of 1st tergite equal to its apical width, its surface posteriorly striate and basally rugose between dorsal carinae (fig. 1.9), dorsal carinae developed in basal 0.9, dorsope distinct, rather small (fig. 1.9); laterope absent; 2nd tergite smooth; length of ovipositor sheath 2.6 mm, and 0.65 times fore wing, sheath normally setose, without apical spine, and ribbon-shaped (fig. 1.1); hypopygium large and posteriorly acute.

Colour. — Black; scapus, pedicellus, propleuron, hind coxa basally, tegulae, epipleura of 1st tergite; pterostigma and most veins of fore wing, dark brown; veins of hind wing and parastigma largely, remainder of legs and annellus, brownish-yellow; palpi brown; wing membrane subhyaline.

Material examined. — Lectotype in the Naturhistorisches Museum Wien: "Austr. infer., Iummerin (?), ex Ch. laricis, Seitner", "♀", "Phaenocarpa Seitneri m., Type, det. Dr. Fahringer".

Additionally examined specimens (deposited in the Station of Forest Zoology, Ardon, France and the Rijksmuseum van Natuurlijke Historie, Leiden, Netherlands): 7♀, 7♂ from Briançon and Montgenevre (both France), reared from *Lasiomma melania* Ackland (larch fly; Anthomyiidae) in cones of *Larix decidua* Miller. Variation: antennal segments of ♀ 33 (1), 34 (1), 35 (2), 36 (2), of ♂ 35 (2), 36 (3), 37 (2), length of antenna about 1.5 times body, length of fore wing of ♀ 4.3-4.5 mm, of ♂ 3.6-3.9 mm; length of ovipositor sheath 0.48-0.57 times fore wing; length of vein 3-SR of fore wing 1.1-1.2 times vein 2-SR; frequently with protuberance on vein 2-SR; hind tarsi of ♂ dark brown or largely yellowish (as ♀); medial carina of propodeum distinct, obsolescent or absent, sometimes with weak propodeal areola; precoxal sulcus

frequently only medially wide and crenulate, and remainder narrow and smooth.

Taxonomic position. — The generic position of *Phaenocarpa seitneri* is somewhat problematical because of the comparatively long vein M + CU of the hind wing, it does not fit well into the genus *Phaenocarpa* Foerster. However, it does not fit well in the genus *Idiasta* Foerster either; *Idiasta* species have apex of ovipositor sheath spiny, vein M + CU of hind wing longer than 1.1 times vein 1-M, wider scutellar sulcus and usually vein CU1b of fore wing shorter or subequal to vein 3-CU1. Therefore it seems best to retain *P. seitneri* in the genus *Phaenocarpa* near the *ruficeps* group because of the narrow scutellar sulcus, but *ruficeps* has vein M + CU distinctly shorter than vein 1-M of hind wing, metanotum protruding dorsally and claws very slender.

## BIOLOGY

(figs. 2-3)

Hosts and geographical range. — *P. seitneri* parasitizes the larvae of

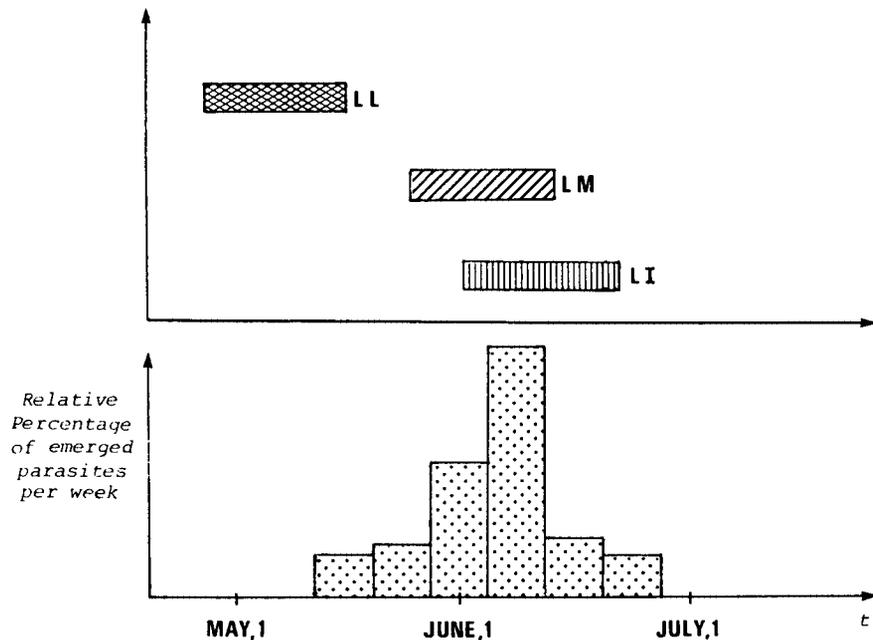


Fig. 2. Observed emergence period of *Phaenocarpa seitneri* Fahringer (PS) in larch stands of the Southern French Alps, located at 1200 m elevation, related to egg-laying periods of the three larch cone flies (*Lasiomma laricicola* Karl-LL; *Lasiomma melania* Ackland-LM; *Lasiomma infrequens* Ackland-LI) in 1984.

various *Lasiomma* species (Diptera, Anthomyiidae) that are restricted to larch cones. Attacks were previously recorded on the single species, *L. laricicola* Karl, in several larch stands of the Palearctic Region, from Central Europe (Austria; Seitner, 1929) to Lake Baikal area (Rhozkov, 1965) and to the Far Eastern Soviet Union (Rimskiy-Korsakov, 1935; Stadnitskii et al., 1977, 1978). However, we have observed *P. seitneri* preying more frequently on *L. melania* Ackland and on *L. infrequens* Ackland, too, in the French Alps. Within this area, distribution of the parasite coincides with the natural range of European Larch, from the Southern Alps to Switzerland, at whatever altitude.

Biological cycle. — Adult emergence period is synchronized with egg-laying of the host species in which previous larval development took place. Therefore, parasite emergences can be observed during about a month within stands where several host species are simultaneously present (fig. 2). This period occurs from late May till late July in the French Alps, depending on altitude. It cannot be proved whether *P. seitneri* lays its eggs into the eggs of *Lasiomma* or inside the young larvae just developing within the cones. Subsequent larval development of parasites takes place entirely inside host larvae which continue to feed on the cones. *Lasiomma* larvae leave the cones from late June till early September and build puparia in the litter in order to hibernate. Parasite nymphosis occurs in host puparia the following spring but larvae may remain in prolonged diapause for up to three years. The annual percentage of *Phaenocarpa* entering prolonged diapause varies from 5 to

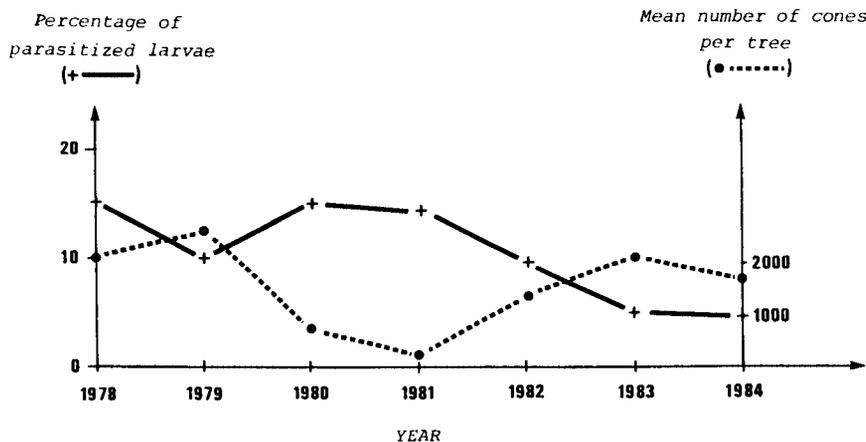


Fig. 3. Comparative annual fluctuations of larch cone crop and mean number of 3rd-instar larvae of *L. melania* parasitized by *P. seitneri* per tree, in the same larch stand of Briançon (1200 m elevation) over a 7-year period.

about 50% but it is strongly correlated with that of *Lasiomma*. This allows the parasites to compensate for annual fluctuations of their hosts, related to crop variations (Roques et al., 1984).

Biological importance. — Parasitized larvae of *L. melania* never exceeded the annual percentage of 15% during seven consecutive years in the French Alps (fig. 3). Parasitism rate seems to be similar in other host species. Stadnitskii et al. (1978) noticed a percentage of parasitized larch cones flies close to 6% in the area of Lake Baikal. However, relative importance of *P. seitneri* in regard to the other parasites varies with cone production. When cone crop decreases suddenly, *P. seitneri* is generally the main parasite of *L. melania* in the French Alps. Host eggs, concentrated on the few available cones, could be more easily discovered by this parasite. Conversely, it is replaced by ectoparasitic Ichneumonids, showing more efficient host-finding abilities, when cone production increases regularly and, consequently, cone fly eggs are dispersed. Nevertheless, *P. seitneri* does not seem to play a significant part in the regulation of *Lasiomma* populations, probably due to a considerable elimination of parasitized puparia during overwintering in the litter.

#### ACKNOWLEDGEMENTS

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