

***Coccophagus (Polycoccophagus) insidiator* Dalman, 1826 (Hymenoptera: Chalcidoidea: Aphelinidae), a Trans-Palaeartic aphelinid species developing in *Eulecanium* species (Homoptera, Coccidae).**

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*Coccophagus insidiator* (Dalman, 1826) (= *C. aterrimus* Vikberg, 1966, syn. nov.; = *Coccophagus stepanovi* Sugonjaev & Pilipyuk, 1972, syn. nov.) This aphelinid species has Trans-Palaeartic distribution and all confirmed hosts are species of *Eulecanium* (Homoptera, Coccidae). It is shown that many published records of *Coccophagus insidiator* are misidentifications .

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## Introduction

Dalman (1826: 371) gave a short description of both sexes of the „pteromalid“ *Entedon insidiator*. The description is based on specimens reared in Sweden from females of *Coccus hordeolum* Dalman and other large *Coccus* species that he described as *C. gibber* and *C. cypraeola* (Dalman 1826). These three species of coccids described by Dalman are not treated or even mentioned in Kosztarab & Kozár (1988) about the scale insects of Central Europe. Westwood (1833: 344) placed Dalman's *Entedon* species in his new genus *Coccophagus* with *Entedon scutellaris* Dalman as the type species. Subsequently, *Coccophagus insidiator* (Dalman) was misinterpreted by most authors, including the treatment of the family Aphelinidae of Europe and the Mediterranean area by Ferrière (1965). Graham (1976) was the first who examined the syntypes of *Entedon insidiator* Dalman, and he selected female lectotype and lectoparatypes of Dalman's collection deposited in the Naturhistoriska Riksmuseet, Stockholm from a series of specimens labelled “insidiator e. C. Betulae”.

Graham (1976) also provided a description of the female and male and mentions that the lectotype of *insidiator* runs to couplet 3 and *philippiae* Mercet in Ferrière's key to European *Coccophagus* (1965: 114-115), but differs in some respects from the description of that species. Vikberg (1966) described *Coccophagus aterrimus* from southern Finland (EH: Hatula) and compared the new species with *C. philippiae* Mercet. The holotype and paratype females were reared from *Eulecanium douglasi* Sulz on *Betula pendula* (as *Betula verrucosa* ).

Vikberg (in 1984) compared the the types of *Coccophagus insidiator* Dalman and *C. aterrimus*, in particular the lectotype female and one lectoparatype female and one male from Naturhistoriska Riksmuseet, Stockholm were compared with the holotype and paratypes of *C. aterrimus*. The comparison showed that both species are conspecific: *Coccophagus insidiator* Dalman, 1826 (= *C. aterrimus* Vikberg, 1966, syn. nov.). One further synonym of the species is *Coccophagus stepanovi* Sugonjaev & Pilipyuk, 1972 from Russia, Sakhalin oblast, be-

cause this was synonymized with *C. aterrimus* by Sugonjaev & Trjapitzyn (1978).

### Diagnosis

The following account of diagnostic characters of *Coccophagus insidiator* are based on type material in Dalman's collection, on types of *C. aterrimus*, and on four males and nine females reared from one female of *Eulecanium douglasi* on *Betula nana* from EH: Janakkala, Suurisuo on 5.7.1981 (leg. V. Vikberg).

Female: body black, base of metasoma brown. Mesoscutellum with 3 pairs of setae, and occasionally with 1-3 additional setae. Forewing 0.8-1.1 mm long (from basal constriction of costal cell), 2.1-2.2 as long as wide, longest setae of fringe 0.11 as long as width of disc. Postmarginal vein about half as long as stigmal vein. Submarginal vein with 9-11 dorsal bristles, costal cell dorsally with 6-12 setae. Male: femora and tibiae very thick, tarsi short, tarsal segments short (relative lengths of lectotype female and a paralectotype male; protibia 39 – 32, protarsus 35 – 21, mesotibia 55 – 49, mesotarsus 38 – 24, mesobasitarsus 16 – 6).

### Distribution

The distribution of *Coccophagus insidiator* is given in literature as follows (with most records as *C. aterrimus*): Sweden: Östergötland (Dalman 1826, Thomson 1876; as *Aphelinus insidiator*), Finland (Vikberg 1966), Kazakhstan (southern Altai; Sugonjaev 1976; Yasnosh 1978), Russia: Karelian Republic (Voynovich & Sugonjaev 1987), Yakutian Republic (Sugonjaev & Trjapitzyn 1978), Sakhalin (Sugonjaev & Pilipyuk 1972), Buryatskaya Republic (Sugonjaev 1976; Yasnosh 1978), Primorskiy krai (Yasnosh 1995; as *Coccophagus (Polycocphagus) aterrimus*).

The subgenus *Coccophagus (Polycocphagus)* (type species by original designation on *Coccophagus rosae* Sugonjaev & Pilipyuk,

1972) was created by Sugonjaev (1976). In the same paper Sugonjaev placed *Coccophagus aterrimus* Vikberg in the subgenus *Polycocphagus* and described its female and male; figures of female and male antennae, 7<sup>th</sup> sternum of female, part of ovipositor and male genitalia were presented (Sugonjaev 1976).

Many other records of *Coccophagus insidiator* published in the literature (e.g. Walker 1846, Mercet 1912, Ferrière 1965, Nikolskaya & Yasnosh 1966, Yasnosh 1978) are based on misidentifications; often the misidentified species is *Coccophagus obscurus* Westwood, 1833 (teste Graham 1976 or *obscurus* is mentioned as a synonym). Noyes (2003) regards both *Coccophagus insidiator* and *C. aterrimus* as valid species, and the large number of cited records of *C. insidiator*, including ones from Canada and the U. S. A., most probably represent misidentifications.

### New records of *Coccophagus insidiator*

Finland. EH: Janakkala, Suurisuo (6766:3381), 3 females 12.7.1979; 4 males and 9 females emerged 7.7.1981 from one female of *Eulecanium douglasi* on stem of *Betula nana* taken on 5.7.1981 (leg. V. Vikberg).

EP: Seinäjoki (Peräseinäjoki, 6945:3292), 1 female 10.7.1999 (leg. M. Koponen).

KP: Haapavesi (7129:3417), 1 female 11.7.1995 (leg. M. Koponen). Vihanti (7140:3421), 4 females 12.7.1995 (leg. M. Koponen).

OP: Yli-Ii (7248:3444), 1 female 21.7.1980 in marsh (leg. M. Koponen).

PeP: Rovaniemi (Rovaniemen mlk., Korvala, 7424:3465), 1 female 9.8.1983 (leg. M. Koponen).

Remarks: In Finland there is another dark species of *Coccophagus* which resembles *insidiator* but its antennae are longer, and femora and tibiae of male are not thickened; the identity of this species is still unknown.

### Hosts of *Coccophagus insidiator*

*Eulecanium caraganae* Borchsenius on *Caragana* sp. (Sugonjaev 1976);

*Eulecanium douglasi* (Sulc) on *Betula pendula* (Vikberg 1966; Voynovich & Sugonjaev 1987);

*Eulecanium douglasi* on *Betula nana* (Voynovich & Sugonjaev 1987; this paper see above);

*Eulecanium franconicum* (Lindinger) (= *rhododendri* Danzig) on *Rhododendron dauri* (Sugonjaev 1976);

*Eulecanium franconicum* (Yasnosh 1978);

*Eulecanium* sp. on *Rosa* sp. (Sugonjaev & Pilipyuk 1972);

The biology and preimaginal stages of the species was studied in detail by Voynovich & Sugonjaev (1987) in the northern part of the Karelian Republic, Russia. Male and female larvae have similar morphology and develop as initial endoparasitoids of soft scales. Seasonal cycles of *Coccophagus insidiator* and its host *Eulecanium douglasi* with biennial generations are synchronised as follows: the parasitoid larva of the first instar that hatches in autumn has an unusual shape and hibernates twice in the host larva: first in the first instar larva and, again in the second instar.

### Notes

Dahlbom (1826) mentioned that his *Coccus gibber* lives on stem of e.g. *Betula* ("Björk"). The type series of *Entedon insidiator* was reared from a large species of *Coccus* on *Betula*, and it appears very probable that his *Coccus gibber* is the same species that was later described as *Eulecanium douglasi*. This is supported by the figures of *Coccus gibber* that fit to the ones of *Eulecanium*.

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### Selostus

Dalman (1826) kasvatti koivun kilpikirvasta Itä-Götanmaalta Ruotsista kiilukaisia ja kuvasi lajin nimellä *Entedon insidiator*. Myöhemmin laji vietiin heimoon Aphelinidae ja sen nimeksi tuli *Coccophagus insidiator* (Dalman). Dalmanin itsensä kasvattamat kiilukaiset Tukholman museossa tutki englantilainen tutkija Graham vasta vuonna 1976. Sitä ennen Dalmanin antama lajinimeä oli käytetty väärin toiselle suvun lajille ja oikea Dalmanin laji ehdittiin kuvata kahdesti uutena, ensin nimellä *Coccophagus aterrimus* Vikberg, 1966 Suomesta ja sitten nimellä *Coccophagus stepanovi* Sugonjaev & Pilipyuk, 1972 Sahalinin saarelta. Lajin naaras munii munansa *Eulecanium* -kilpikirvasuvun lajien ensimmäisen asteen toukkiin. Koivuilla elävä isäntälaji on nimeltään *Eulecanium douglasi* ja ainakin pohjoisessa sillä on 2-vuotinen kehitys. Karjalan tasavallassa on todettu että kiilukaisen ensimmäisen asteen toukka talvehtii kahdesti isännän toukassa, ensimmäisen talven ensimmäisessä toukka-asteessa ja toisen talven toisessa toukka-asteessa. Aikuisesta kilpikirvanaaraasta voi sitten kuoriutua toistakymmentä kiilukaista.

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