SOME BIOLOGICAL NOTES ON THE PTEROMALID (*HYM., CHALCIDOIDEA*) GENERA *CAENACIS* FÖRSTER, *CECIDOSTIBA* THOMSON AND *HOBBYA* DELUCCHI, WITH DESCRIPTIONS OF TWO NEW SPECIES

BY

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Caenacis FÖRSTER, *Cecidostiba* THOMSON and *Hobbya* DELUCCHI are included by DELUCCHI (1957) in what he has termed the « *Caenacis-Cecidostiba*-Komplex. » All known species of *Caenacis*, *Cecidostiba* and *Hobbya* are parasitic in Cynipid galls, most commonly on oak. The hosts of the species in the other genera (*Aggelma* DELUCCHI, *Apelioma* DELUCCHI, *Ablaxia* DELUCCHI) included in the *Caenacis-Cecidostiba* complex by DELUCCHI are as yet unknown.

Eggs of *Caenacis*, *Cecidostiba leucopeza* (RATZ). and *C. semifascia* (WALK.) (the other species of this genus have not been studied), and *Hobbya* are laid, usually singly, on the body of the host larva, which is first paralysed by the ovipositing female. The resulting parasite larvae feed ectophagously on the host. In structure they closely resemble other ectophagous Pteromalid larvae (eg. *Mesopolobus*, *Habrocytus*) being clothed in short, sparsely distributed, hairs and having simple, pointed mandibles.

The biological information presented below was obtained in Wytham Wood, Berkshire during 1957-1960, unless another locality is specifically mentioned.

Caenacis FÖRSTER

Caenacis inflexa (RATZEBURG) and *C. divisa* (WALKER) are included by DELUCCHI (*loc. cit.*) in this genus.

Caenacis inflexa (RATZEBURG).

C. inflexa (= *Habrocytus periclisti* CALLAN) is a common parasite in Britain in the rose gall of *Diplolepis rosae* (L.) (ASKEW, 1960) where it feeds on larvae of the inquiline Cynipid *Periclistus brandtii* RATZEBURG

(CALLAN, 1944). Its apparent restriction to *Periclistus* cells prevents its host range from overlapping with that of *Habrocytus bedeguaris* THOMSON, an equally abundant Pteromalid parasite in the gall of *D. rosae*, which appears to attack only the contents of the gall-maker's cell.

Caenacis divisa (WALKER).

This species is an inhabitant of oak galls. I have examined specimens reared from galls of *Cynips divisa* HARTIG, *Andricus kollari* HARTIG, *A. albopunctatus* (SCHLECHTENDAL) and *A. testaceipes* f. *sieboldi* (HARTIG).

Caenacis divisa overwinters as a larva in galls of *Cynips divisa* from which, in spring, ten specimens (8 males, 2 females) were reared. Galls kept in a heated room produced this species during the winter; a female *Caenacis divisa* emerged in December 1957 from a gall of *A. kollari* collected during the previous October and kept indoors. In the British Museum (Nat. Hist.) three females of *Caenacis divisa* are labelled as emerging in May 1959 from galls of *A. testaceipes* f. *sieboldi*, gathered by J. F. PERKINS in March at Arbrook Common, Surrey.

The spring generation attacks new galls of *A. albopunctatus*, in two galls of which its pupae were found in cells of *Synergus gallaepomiformis* (FONSCOLOMBE). These two galls were gathered on June 29th, 1959. One contained five pupae and an adult male of *Caenacis divisa* when opened on the following day. The pupae (4 female, 1 male) produced adults early in July. *Mesopolobus tibialis* (WESTWOOD) larvae had attacked other *Caenacis divisa* in this gall. In the second gall a pupa of *Caenacis divisa* was being eaten by a larva of *Eurytoma brunniventris* RATZEBURG.

Thus, although adult *Caenacis divisa* were not taken in the field, rearing records show the species to have at least two generations during a year with an alternation of host galls. Its most usual host gall seems to be that of *Cynips divisa*, but since this gall is not formed until late June, the first generation of *Caenacis divisa* must oviposit in spring galls.

The common specific name to *Caenacis divisa* and *Cynips divisa* is evidently coincidental since WALKER's specimens of *Caenacis divisa* were not bred.

Cecidostiba THOMSON

Two species, *Cecidostiba semifascia* (WALKER) and *C. leucopeza* (RATZEBURG), both parasites in the oak gall of *Biorhiza pallida* (OLIVIER). are included by DELUCCHI (*loc. cit.*) in this genus. Descriptions of two new species, and a redescription of a third, are given below. Of these *C. adana* sp. n. and *C. geganius* (WALKER) are oak gall parasites;

the other, *C. fasciata* sp. n., is a parasite in the gall of *Pediaspis aceris* FÖRSTER on *Acer*. These three species run to *Cecidostiba* in the key given by DELUCCHI (*loc. cit.*), but their inclusion in this genus makes it necessary to modify DELUCCHI's generic description in a few details. A redescription of *Cecidostiba* follows.

Head broader than thorax, narrowed and rounded behind eyes; genae buccate; vertex not margined behind ocelli; clypeus with anterior margin straight or incised medially (incision not so large as in *Caenacis*); left mandible with 4 teeth, right mandible with 3 teeth; eyes bare, not very prominent. Antennae 13-segmented (11263), inserted about or below middle of face, but above ventral limits of eyes; clava rather small; rhinaria on funicle segments in single or double transverse rows; funicle segments of males with relatively long hairs.

Pronotum with collar margined (except perhaps *geganius*), narrow, especially medially; mesoscutum with short, incomplete notaulices visible only anteriorly; prepectus triangular, moderately large; scutellum with frenal groove indistinct; propodeum usually short and transverse, sculpturation variable but often with several short, longitudinal keels laterad of median carina (not in *geganius*), spiracles separated from anterior margin of propodeum by a distance about equal to or less than their minor diameter, nuccha small; thorax in lateral view convexly curved, often strongly so, clothed by stout, scattered hairs. Forewing sometimes fuscous-marked; marginal and postmarginal veins approximately equal in length and longer than stigmal vein; stigma normal to large; costal cell hairy only beneath.

Gaster of female as long as or longer than head plus thorax, acuminate behind; ovipositor sheaths not exserted; petiole transverse, smooth.

KEY TO SPECIES OF *Cecidostiba*.

1. First funicle segment shorter than pedicel (fig. 2); basal cell of forewing hairy in distal third (fig. 6); frons extends well in front of eyes; lateral ocelli separated by about four times their length from orbit; forewing of female with large, central, fuscous area and without fascia across stigmal vein. . . . . ***geganius*** (WALKER)

–. First funicle segment at least as long as pedicel (figs. 1, 3, 4, 5); basal cell of forewing bare or with only a few hairs; frons barely extends in front of eyes; lateral ocelli separated by at most 2.5 times their length from orbit; forewing of female hyaline or with a fascia across stigmal vein. 2

2. Forewing (♀) with speculum closed below by a line of hairs and with a dark fascia across stigmal vein (fig. 8) . . . . . ***fasciata*** sp. n.

–. Forewing (♂, ♀) with speculum open below and only occasionally (♀ *semifascia*) with a faint fascia across stigmal vein. 3

3. Clypeus incised medially; stigma large; frons rugose. 4
–. Clypeus not incised medially; stigma normal; frons lightly reticulate. . . . . *semifascia* (WALKER)
4. Scutellum steeply declived posteriorly (fig. 13); propodeum of female usually with incomplete and weak lateral plicae; rhinaria on funicle segments in single, irregular, transverse rows (fig. 5) . . . . . *leucopeza* (RATZEBURG)
–. Scutellum not steeply declived posteriorly (fig. 12); propodeum of female usually with complete and moderately strong lateral plicae; rhinaria on funicle segments in two overlapping transverse rows (fig. 3) . . . . . *adana* sp. n.

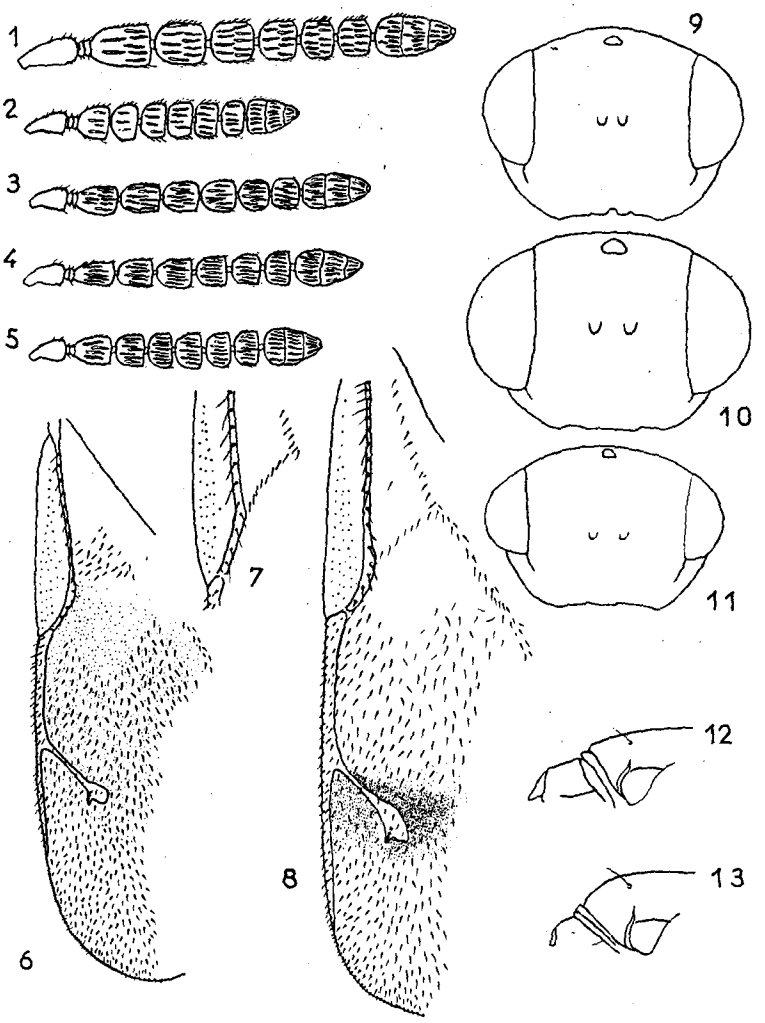
Cecidostiba geganius (WALKER) (figs. 2, 6 and 11).

(*Gastrancistrus geganius* WALKER, 1848, *List Hym. Ins. Brit. Mus.*, 2 : 105, 107, ♂).

Dr. M. W. R. DE V. GRAHAM (Hope Department of Entomology, Oxford) informs me that the male type of this species, which agrees very well with the description, is in the British Museum (Nat. Hist.) and has two labels bearing the full name (one printed, the other in WALKER's handwriting). The following is a redescription of the species, based on the female, from recent material. I have not examined the type specimen in the British Museum, but Dr. GRAHAM has examined my material and is satisfied that it corresponds to WALKER's species.

FEMALE. Reddish purple with green reflections; antennal scape and pedicel testaceous, pedicel with dark spot dorsally; flagellum fuscous; coxae and femora concolorous with thorax; trochanters, tibiae and tarsi testaceous, latter darkened medially; claws fuscous; forewing infuscate just distal of basal vein to beyond stigma. Length 3.1 mm.

Head in dorsal view moderately narrowed behind eyes, broader than thorax and about 3.8 times as broad as medially long; ocelli small, in a triangle of 130°, POL : OOL as 1.7 : 1, lateral ocelli separated from orbit by a distance about four times their own diameter; frons extends well in front of eyes, shallowly emarginate, finely reticulate; malar space nearly equal to transverse diameter of eye, genal sulcus ill-defined; eyes relatively small, elliptical, separated by a distance about 1.8 times their length; clypeus strigose, its anterior margin smooth, shining and straight (fig. 11). Antennae inserted below middle of face and slightly above ventral limits of eyes; scape not reaching median ocellus; pedicel twice as long as broad, approximately equal in length to first funicle segment plus annelli; first funicle segment quadrate, remainder transverse, rhinaria sparse and in a single transverse row on each segment; clava slightly broader than funicle segments, not much longer than last two together (fig. 2).



FIGS. 1-5. — Flagellum of ♀ : 1, *Cecidostiba fasciata* sp. n.; 2, *geganius* (WALK.); 3, *C. adana* sp. n.; 4, *C. semifascia* (WALK); 5, *C. leucopeza* (RATZ.).

FIGS. 6-8. — Part of forewing of ♀ : 6, *Cecidostiba geganius*; 7, *C. adana*; 8, *C. fasciata*.

FIGS. 9-11. — Head in frontal view of ♀ : 9, *Cecidostiba adana*; 10, *C. fasciata*; 11, *C. geganius*.

FIGS. 12-13. — Propodeum and scutellum in lateral view of ♀ : 12, *Cecidostiba adana*; 13, *C. leucopeza*.

Pronotum with collar at most very weakly margined; mesoscutum length : breadth as 1 : 1.5, lightly reticulate; scutellum more finely reticulate than mesoscutum, 0.8 times as long as mesoscutum; propodeum medially about 0.3 times as long as scutellum, with weak median carina, area between spiracles fairly evenly reticulate, lateral plicae absent, spiracles not much longer than broad, spiracular sulcus shallow; prepectus forming a nearly equilateral triangle. Forewings extending almost to apex of gaster; marginal vein : postmarginal vein : stigmal vein as 1 : 1.04 : 0.78; basal cell hairy in distal third; cubital vein bare; speculum open below (fig. 6).

Gaster ovate, longer than head plus thorax (1.3 : 1), rather broader than thorax, dorso-ventrally compressed.

MALE. Resembles female in colour and general structure, but marginal vein is shorter and about equal in length to stigmal vein, basal cell of forewing more extensively hairy, forewing much less heavily infuscate. Length 1.9 mm.

MATERIAL STUDIED. England : Shropshire, Wyre Forest, 1 ♂, 7 ♀♀ ex galls *Andricus quercus-radicis* (F.), June 1960 (R. R. ASKEW); France : Rennes, 123 ♂♂, 873♀♀ ex galls *A. quercus-radicis*, May 1960 (galls collected by R. FOLLIOT).

10 males and 20 females will be deposited in the Hope Department of Entomology, University Museum, Oxford.

From the description and key it will be appreciated that *C. geganius* differs from the other known species of *Cecidostiba* in a rather large number of characters, and it may eventually prove necessary to erect a new genus to contain it. However I prefer not to take this step at present since it seems probable that other species of *Cecidostiba* await description and our conception of the genus may have to be further modified.

Cecidostiba fasciata sp. n. (figs. 1,8 and 10).

FEMALE. Dark blue with green reflections; antennal scape testaceous; pedicel and flagellum fuscous; coxae and femora concolorous with thorax; trochanters fuscous; tibiae and tarsi flavous; claws fuscous; forewings with transverse fuscous band across stigmal vein. Length 3.8 mm.

Head in dorsal view moderately narrowed behind eyes, broader than thorax and about 4.3 times as broad as medially long; ocelli large, in a triangle of about 115°, POL : OOL as 2.2 : 1, lateral ocelli separated from orbit by a distance about equal to their own diameter; frons scarcely extends in front of eyes, very shallowly emarginate, finely reticulate; malar space not much greater than half transverse diameter of eye, genal sulcus ill-defined; eyes elliptical, separated by a distance

about 1.2 times their length; clypeus strigose, its anterior margin smooth, shining and straight (fig. 10). Antennae inserted about middle of face and well above ventral limits of eyes; scape reaching median ocellus; pedicel twice as long as broad, approximately equal in length to first funicle segment; funicle segments 1-3 longer than broad, last three quadrate or slightly transverse, rhinaria in two discrete transverse rows; clava scarcely broader than funicle segments, distinctly longer than last two together (fig. 1).

Pronotum with collar weakly margined; mesoscutum length : breadth as 1 : 1.4, reticulate; scutellum more finely reticulate than mesoscutum, 0.8 times as long as mesoscutum; propodeum medially about 0.3 times as long as scutellum, with weak median carina, smooth about median carina but lightly reticulate laterad, spiracles distinctly longer than broad, spiracular sulcus rather shallow; prepectus forming an acute-angled triangle. Forewings not reaching apex of gaster; marginal vein : postmarginal vein : stigmal vein as 1 : 1.11 : 0.64; basal cell with at most one or two hairs; cubital vein hairy throughout; speculum large and closed below (fig. 8).

Gaster lanceolate, longer than head plus thorax (1.3 : 1), narrower than thorax.

MALE. Unknown.

MATERIAL STUDIED. France : La Rochelle, 5 ♀♀ (1 ♀ the type) ex galls *Pediaspis aceris* FÖRSTER, July 1960 (second year of galls) (galls collected in April by R. FOLLIOT).

Holotype and 2 paratypes will be deposited in the Hope Department of Entomology, University Museum, Oxford.

Cecidostiba adana sp. n. (figs. 3, 7, 9 and 12).

FEMALE. Green with bronze reflections; antennal scape and pedicel testaceous, pedicel with dark spot dorsally; flagellum fuscous; coxae and femora concolorous with thorax; trochanters, tibiae and tarsi flavous; claws fuscous; wings hyaline. Length 3.2 mm.

Head in dorsal view moderately narrowed behind eyes, broader than thorax and about 4.0 times as broad as medially long; ocelli moderately large, in a triangle of about 130°, POL : OOL as 2.0 : 1, lateral ocelli separated from orbit by a distance about 1.5 times their own diameter; frons extends slightly in front of eyes, relatively strongly emarginate, rugose; malar space not much greater than half transverse diameter of eye, genal sulcus ill-defined; eyes elliptical, separated by a distance about 1.4 times their length; clypeus strigose, its anterior margin incised medially (fig. 9). Antennae inserted about middle of face and well above ventral limits of eyes; scape reaching median ocellus; pedicel twice as long as broad, approximately equal in length

to first funicle segment; funicle segments 1-3 longer than broad, 4 quadrate, 5 and 6 transverse, rhinaria in two overlapping transverse rows; clava very slightly broader than funicle segments, distinctly longer than last two together (fig. 3).

Pronotum with collar strongly margined; mesoscutum length : breadth as 1 : 1.3, strongly reticulate; scutellum more finely reticulate than mesoscutum, especially medially, 0.8 times as long as mesoscutum, not steeply declived posteriorly (fig. 12); propodeum medially about 0.3 times as long as scutellum, median carina and lateral plicae strong, with a few short, curved carinae between median carina and plicae, otherwise median area shining and almost smooth, spiracles distinctly longer than broad, spiracular sulcus shallow; prepectus forming an acute-angled triangle. Forewing extending beyond apex of gaster, marginal vein : postmarginal vein : stigmal vein as 1 : 1.03: 0.82, basal cell with at most 1 or 2 hairs, cubital vein hairy only beneath distal third or so of basal cell, speculum large and open below (fig. 7).

Gaster lanceolate, about equal in length to head plus thorax, narrower than thorax.

MALE. Resembles female in colour and general structure but marginal vein is shorter and about equal in length to stigmal vein, basal cell of forewing with a few more hairs than in female. Length 2.1 mm.

MATERIAL STUDIED. France : Rennes, 46 ♂♂, 50 ♀♀ (1 ♀ the type) ex galls *Andricus calicis* BURGSD., April and May 1960 (second year of galls); Rennes, 1 ♂, 1 ♀ ex galls *A. kollari* HARTIG, 1960 (second year of galls); Dinard, 2 ♂♂ ex galls *Cynips longiventris* HARTIG, May 1960 (second year of galls). All above galls collected by R. FOLLIOT.

Holotype and 14 paratypes (7 ♂♂, 7 ♀♀) will be deposited in the Hope Department of Entomology, University Museum, Oxford.

Cecidostiba leucopeza (RATZEBURG).

This species is, in the author's experience, specific to the oak-apple gall of *Biorhiza pallida*. A total of 124 specimens (55 males, 69 females) were reared from galls collected at Wytham Wood, Berkshire; Hell Coppice, Buckinghamshire; Neville's Cross, Durham; Coldstream, Berwickshire; Arrochar Dunbartonshire; and Ardnamurchan, Argyllshire. There are two generations during a year, which is somewhat unusual for a Chalcid which is specific to one type of gall (*cf. Ormocerus* spp., some *Olynx* spp., some *Syntomaspis* spp. (ASKEW, in preparation)). The only specimen taken in the field was a female on May 18th, 1959; this would be a representative of the first generation which overwinters in the fully grown larval condition. Galls of *B. pallida* often do not fall to the ground when fully grown in

June of the year of their formation but remain fastened to the trees, sometimes for a year or more. Collections of such galls made in late autum and winter yield first generation *C. leucopeza* adults during the following May and June (much earlier if the galls are kept in a heated room). These first generation insects attack the new *B. pallida* galls which first appear on the oak trees in early May. Insects of the second generation emerge from these first year *B. pallida* galls in July, August and September and attack those galls of *B. pallida* which remain attached to the trees, and so complete the annual life cycle. First year galls of *B. pallida* gathered from trees in July and August sometimes yield insects of both generations, which indicates that adults of the first and second generations have some temporal overlap.

C. leucopeza larvae, ultimately reared to adults, were found feeding on larvae of *Olynx skianeuros* (RATZEBURG).

Cecidostiba semifascia (WALKER).

A total of 130 specimens (57 males, 73 females) of *C. semifascia* were reared from galls of *Biorhiza pallida* collected at Wytham Wood. Berkshire; Hell Coppice, Buckinghamshire; Coldstream, Berwickshire: and Ardnamurchan, Argyllshire. The species was not taken in the field in the adult state, but rearing from galls has shown it to have a similar bivoltine life cycle to *C. leucopeza*.

The means by which *C. leucopeza* and *C. semifascia* are ecologically separated is at present unknown. That they attack different hosts in the gall of *B. pallida* is a possibility, but unlikely in view of the usual polyphagous nature of gall inhabiting Pteromalid larvae generally. A more likely hypothesis is that the two species search for galls at different heights in the oak canopy. The scarcity of field captures of adults of these two common species indicates that they both fly high [*cf. Olynx skianeuros* (RATZ.), *Syntomaspis apicalis* (WALK.), both parasites in the gall of *B. pallida* (ASKEW, in preparation)], and a gall collected from the top of a mature oak tree was found to contain the high proportion of six Pteromalid (= *Cecidostiba?*) larvae and eggs in twenty cells.

Hobbya DELUCCHI

DELUCCHI (*loc. cit.*) erected this genus with one included species, *H. stenonota* (RATZEBURG). The present author (1959) has described a second species, *H. kollari*.

Hobbya stenonota (RATZEBURG).

This species, like *Cecidostiba leucopeza* and *C. semifascia*, is confined in its immature stages to the oak gall of *Biorhiza pallida*, in which there are two generations during a year. A total of 85 specimens

(21 males, 64 females) were reared from these galls collected at Wytham Wood and Cothill, Berkshire; Hell Coppice, Buckinghamshire; Poole, Dorset; Neville's Cross, Durham; and Arrochar, Dunbartonshire. The life cycle appears to be similar to that of *Cecidostiba leucopeza* and *C. semifascia* (*antea*), although adults of the spring generation of *H. stenonota* emerge rather later from galls collected during the winter than do those of the two *Cecidostiba* psecies. A larva of *H. stenonota* (the adult was reared) was found feeding on an adult *Torymus cingulatus* NEES.

Hobbya kollari ASKEW.

This species was described from three adults (1 male, 2 females) reared from larvae removed in January 1958 from cells of the inquiline Cynipid, *Synergus reinhardi* MAYR, in oak galls of *Andricus kollari* HARTIG gathered at Hell Coppice, Buckinghamshire. Subsequently I have had 5 females and 2 males from second year galls of *A. kollari* gathered at Rennes, France by R. FOLLIOT.

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RÉSUMÉ

Avec les descriptions de deux nouvelles espèces de *Cecidostiba* THOMSON élevées des galles de France, la présente étude apporte des précisions sur la biologie des espèces des genres suivants de Pteromalides (*Hymenoptera, Chalcidoidea*) : *Caenacis* FÖRSTER, *Cecidostiba* et *Hobbya* DELUCCHI, parasites dans les galles de Cynipides.

Les deux nouvelles espèces sont *Cecidostiba adana* (ex galles *Andricus calicis, A. kollari* et *Cynips longiventris* sur *Quercus*) et *C. fasciata* (ex galles *Pediaspis aceris* sur *Acer*). *C. geganius* (WALK.) est parasite dans les galles d'*Andricus quercus-radicis* sur *Quercus*. *Hobbya stenonota* (RATZ.), *Cecidostiba leucopeza* (RATZ.) et *C. semifascia* (WALK.) sont parasites dans les galles de *Biorhiza pallida* sur *Quercus*, *Hobbya kollari* ASKEW est parasite dans les galles de *Andricus kollari*, *Caenacis divisa* (WALK.) est parasite dans les galles de *Cynips divisa, Andricus kollari, A. albopunctatus* et *A. testaceipes* f. *sieboldi* sur *Quercus*, et *Caenacis inflexa* (RATZ.) est parasite dans les galles de *Diplolepis rosae* sur *Rosa*.

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