Two new species of *Cleruchus* (Hymenoptera: Mymaridae) from The Netherlands and California, USA, apparently associated with Ciidae (Coleoptera) in bracket fungi

Serguei V. Triapitsyn
Leen G. Moraal

KEY WORDS
Egg parasitoid, Fomitopsidaceae, fairyfly wasps, dead trees

Entomologische Berichten 68(2): 62-68

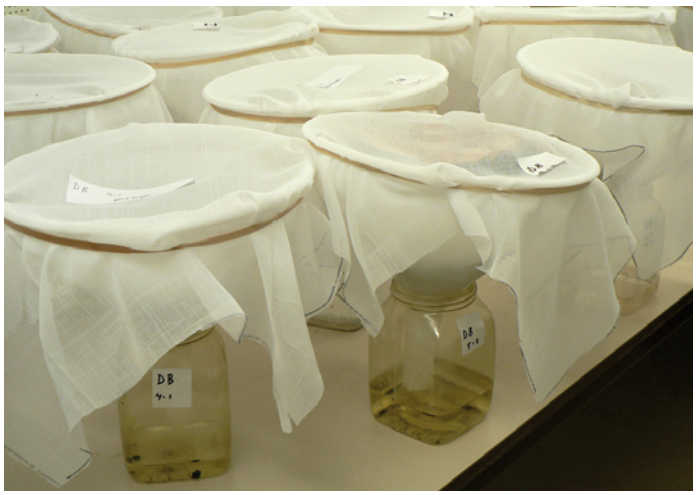
A new species of the fairyfly wasp genus *Cleruchus* Enock 1909 (Hymenoptera: Mymaridae), *C. polypori* Triapitsyn & Moraal sp. nov., is described and illustrated. The specimens were reared from fruiting bodies of the bracket (polypore) fungus *Fomes fomentarius* on ca. 150-200 year old *Fagus sylvatica* trees in The Netherlands. The fungi were infested with the beetles *Cis castaneus* Mellié 1848, *C. nitidus* Fabricius 1792, and *Ennearthron cornutum* (Gyllenhal 1827) (Coleoptera: Ciidae), which are apparent hosts of this newly described taxon. It was also reared from fruiting bodies of the same bracket fungus on *Betula* sp. in The Netherlands. Females of *C. polypori* sp. nov. are mostly fully winged, rarely brachypterous or apterous, while males are apterous. Another species from the same group, *C. puchus* Triapitsyn sp. nov., is described from California, USA. The type series of this new species, whose females are fully winged and males are either fully winged or often brachypterous, was reared from eggs of the undetermined cultured Ciidae beetles associated with a *Polyporus* sp., and also from the bracket fungus *Trametes versicolor*. A key is provided to the three species of *Cleruchus* that appear to be associated with Ciidae in bracket fungi (Polyporales: Fomitopsidaceae). New information on the association of *Camptoptera aula* Debauche 1948 with the bracket fungi in The Netherlands is also provided.

Introduction

Only during the last two decades, weakened and dead trees are left in the Dutch forests to enhance the biodiversity. Since then, the populations of the polypore bracket fungus *Fomes fomentarius* have increased significantly, because such trees are a suitable substrate for the development of this fungus. That raised the question if the accompanying insect fauna would be able to colonize new habitats or that spatial isolation could prevent this. During the summer of 2006 a total of 70 fruiting bodies of *F. fomentarius* were collected in seven sites (figure 1). The fungi were separately placed in plastic funnels, covered with a fine net curtain, hanging in bottles containing a preservative fluid (figure 2). For further details, see Jagers op Akkerhuis *et al.* (2007). The mymarid parasitoids, which emerged during 8-29.xi.2006 from the fruiting bodies of *F. fomentarius*, were preserved in 70% ethanol and sent to the first author for identification. Subsequently, they were identified as belonging to a new, very distinctive, species of *Cleruchus*. We describe it here as *C. polypori* Triapitsyn & Moraal sp. nov. During 2007, it was also reared from the fruiting bodies of the same bracket fungus on *Betula* sp. in The Netherlands. Several species of Ciidae and many other beetles also emerged from the same host fungi during 2006 (their list can be supplied by the second author).

Cleruchus Enock 1909 is a rather poorly known cosmopolitan genus of Mymaridae (Hymenoptera). Generic diagnoses were given by Enock (1909), Debauche (1948), and Schauff (1984), but their definitions of *Cleruchus* are too narrow (Triapitsyn 2002). In the Palaearctic and Nearctic regions, members of *Cleruchus* can be identified using the keys given by Triapitsyn & Huber (2000) and Huber (1997), respectively. In Europe, most described species of *Cleruchus* were keyed by Novicky (1965). Hosts of the members of *Cleruchus* are poorly known; the few available host records were reviewed by Huber (1986), these include Acrididae (Orthoptera) and Cleridae (Coleoptera). *Cleruchus pieloui* (Yoshimoto 1971) was reared from the birch bracket fungus, *Piptoporus betulinus* (as *Polyporus betulinus*), in New Brunswick, Canada (Yoshimoto 1971). The insect host(s) of *C. pieloui* is (are) unknown (Yoshimoto 1971), but we speculate that this species is parasitizing eggs of Ciidae (Coleoptera), which among other beetles inhabit the bracket (polypore) fungi (Polyporales: Fomitopsidaceae). The likelihood is quite high because several species of Ciidae were listed by Pielou & Verma (1968) from the same

1. One of the locations (Dassenberg) with 150-200 year dead old *Fagus sylvatica*, as an important substrate for the bracket fungus *Fomes fomentarius*. Photo: Leen Moraal.
1. Een van de locaties (Dassenberg) met 150-200 jaar dode oude beuken als een belangrijk substraat voor de echte tonderzwam *Fomes fomentarius*.



2. Funnels covered with fine net curtain, each containing fruiting bodies of *Fomes fomentarius*. Photo: Leen Moraal.
2. Trechters afgedekt met fijne vitragestof met daarin de vruchtlichamen van *Fomes fomentarius*.

collections in New Brunswick as *C. pieloui* (as *Cleruchus* sp.).

Using this opportunity, we also report findings of *Camptoptera aula* Debauche 1948 in three other species of bracket fungi, all collected by the 2nd author during the summer of 2007 in Wageningen, Gelderland, The Netherlands (emerged in the laboratory during August and September 2007) [material in the Entomology Research Museum, University of California, Riverside, California, USA]: 5 ♀, 8 ♂ from *Ganoderma* sp. on *Fagus sylvatica* (51°58'40.10"N 5°42'20.27"E, collected 6.viii.2007), 8 ♀, 8 ♂ from *Daedaleopsis confragosa* (from an old fungus) on *Sorbus* sp. (51°59'05.55"N 5°39'28.74"E, collected 28.vi.2007), and 3 ♀, 1 ♂ from *P. betulinus* on *Betula* sp. (51°58'37.46"N 5°42'31.25"E, collected 1.viii.2007). *Camptoptera aula* is regarded as a new species for the Dutch fauna (C. van Achterberg pers. comm.). It is interesting to note that *C. aula* has a similar (elongate) type of the body shape as *C. polypori* sp. nov. A list of the beetle species associated with these bracket fungi can be supplied by the second author.

The first author has also identified a series of poorly preserved (badly shriveled, likely caused by air drying) specimens of another undescribed species of *Cleruchus*, which emerged 9-14.vi.1964 from a *Polyporus* sp. fungus and a culture of Ciidae, initially collected 22.v.1964 by G.I. Stage at Morgan Territory Road, 10 miles SE of Clayton in Contra Costa County, California, USA (material in the Essig Museum of Entomology, University of California, Berkeley, California, USA). This species is described here as *C. puchus* Triapitsyn, sp. nov. A key is given to the three aforementioned species, which informally may be grouped to the *pieloui* species group of *Cleruchus*, characterized by the elongate bodies and the apparent host associations with the Ciidae in bracket fungi. It is very likely that more species of *Cleruchus* and possibly also *Camptoptera*, associated with various bracket fungi throughout the world, remain to be discovered.

All specimens of the type series of *C. polypori* sp. nov. were critical point dried and card-mounted from material preserved in 70% ethanol; three females and two males were then selected, cleared in 10% KOH, dissected, and slide-mounted in Canada balsam. Specimens of *C. puchus* sp. nov. were slide- or card-mounted from the dry material kept in gelatin capsules. Measurements were made from slide-mounted specimens; unless otherwise indicated, all measurements (as length or length/width, if necessary) are given in micrometers. Terms for morphological features follow Gibson (1997). Abbreviations for the collections are as follows: CNCI, Canadian National Collection of Insects, Ottawa, Ontario, Canada; EMEC, Essig Museum of Entomology, University of California, Berkeley, California, USA; RMNH, National Museum of Natural History (Nationaal Natuurhistorisch Museum Naturalis), Leiden, The Netherlands; UCRC, Entomology Research Museum, University of California, Riverside, California, USA; USNM, National Museum of Natural History, Washington, District of Columbia, USA. An abbreviation used in the key and the description is: F = funicle (flagellar in males) segment.

Key to the *pieloui* species group of *Cleruchus*, both sexes

1 ♀ (antennal flagellum clavate, 7-segmented) 2
- ♂ (antennal flagellum filiform, 11-segmented) 5
2(1) Apterous 3
- Fully winged or, rarely, brachypterous 4
3(2) Clava notably shorter than F4-F6 combined (figure 3A) ..... *C. polypori* sp. nov. (part)
- Clava notably longer than F4-F6 combined ..... *C. pieloui* (Yoshimoto 1971)
4(2) Clava notably shorter than F4-F6 combined (figure 3A); ovipositor 1.4-1.5 × length of metatibia ..... *C. polypori* sp. nov. (part)
- Clava about as long as F4-F6 combined (figure 5A); ovipositor about as long as metatibia ..... *C. puchus* sp. nov.
5(1) Apterous 6
- Fully winged or, often, brachypterous .... *C. puchus* sp. nov.
6(5) Associated with *Fomes fomentarius* in Europe (The Netherlands) ..... *C. polypori* sp. nov.
- Associated with *Piptoporus betulinus* in North America (Canada) ..... *C. pieloui* (Yoshimoto 1971)

Arthropod community in the bracket fungus *Fomes fomentarius*

In this polypore bracket fungus a number of arthropod species can be found, forming an interesting community. During the present study of insect diversity, focused on Coleoptera and Hymenoptera, of the fruiting bodies of this fungus, we collected xylophagous, fungivorous, predatory and parasitic species (see also Jagers op Akkerhuis et al. 2007). The fungivorous community mainly comprises Ciidae, Anobiidae and Tenebrionidae (Coleoptera). These species 'hatch' from the fruiting bodies as adults, leaving clearly visible exit holes as can be seen in the photo. These fungivorous and other fungus inhabiting species can be attacked by a number of parasitoids. We found mainly species belonging to the Bethylidae and Mymaridae (Hymenoptera). In general, these parasitic species lay their eggs in the larvae or eggs of beetles, thereafter the parasitoid egg hatches and the small parasitoid larva eats the contents of its host before emerging as an adult. The fungivorous beetles are tunneling inside the fungus and the small Hymenoptera can easily enter and leave the fungus by the beetles' entrance and exit holes.

The Mymaridae described in this article are among the smallest insects in the world, with a body size of less than one mm. The wings are reduced to rods which bear a fringe of hairs – brachypterous individuals occur as well. Mymaridae are known parasitoids of Coleoptera, Hemiptera and Psocoptera. Even aquatic Mymaridae species occur; the adults swim under water to parasitize the eggs of water beetles (e.g. Dytiscidae).

Bracket fungus *Fomes fomentarius* with exit holes of beetles. Photo: Leen Moraal.
Tonderzwam *Fomes fomentarius* met gaatjes waaruit kevers zijn gekropen.

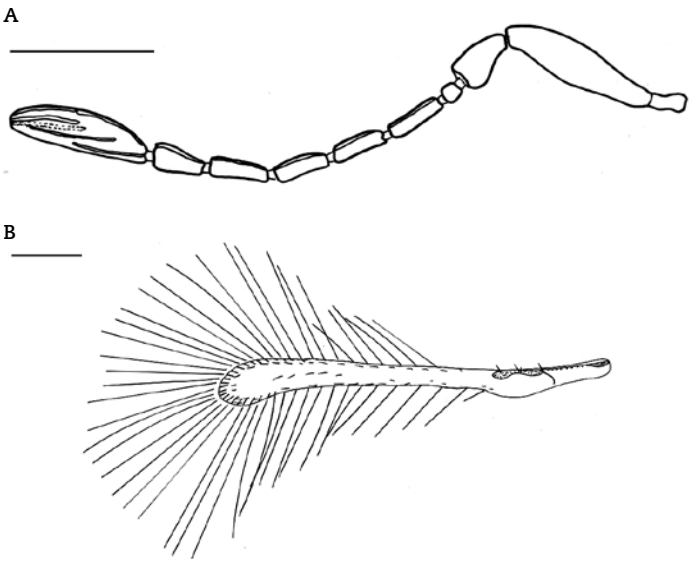
Synopsis of the species

Cleruchus polypori Triapitsyn & Moraal, sp. nov.

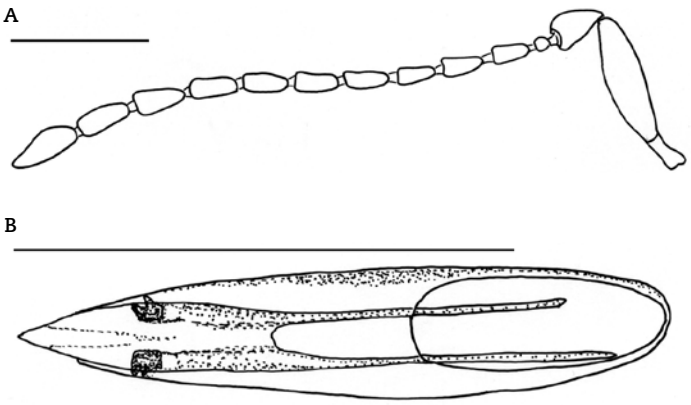
figures 3 and 4

Type material Holotype female on slide [RMNH], labeled: 'THE NETHERLANDS: Gelderland, Dassenberg (close to the city of Apeldoorn), 52°13'35.38"N 5°51'0.44"E, 8-29.xi.2006, L. Moraal. Ex. polypore fungus *Fomes fomentarius* on *Fagus sylvatica* trees; likely associated with Ciidae (which also emerged)'.
Paratypes Same data as the holotype - 2 ♀, 2 ♂ on slides and 26 ♀, 11 ♂ on points [UCRC]; 1 ♀, 1 ♂ on points [CNCI]; 7 ♀, 3 ♂ on points [RMNH]; 1 ♀, 1 ♂ on points [USNM].

Additional material examined THE NETHERLANDS. Gelderland: Gortelse Bos 52°19'9.59"N 5°51'27.05"E, Weversbergen 52°3'5.38"N 6°2'40.50"E, and Wolfheze 51°59'43.03"N 5°48'25.76"E, 8-29.xi.2006, L.G. Moraal (probably from Ciidae eggs in fruiting bodies of the polypore fungus *Fomes fomentarius* on *Fagus sylvatica* trees, collected vii-xi.2006), numerous ♀ and ♂ in alcohol [UCRC and L.G. Moraal alcohol collection, Wageningen, The Netherlands]. National Park de Hoge Veluwe, 52°7'6.82"N 5°51'56.90"E, 6.vii.2007, L.G. Moraal (from fruiting body polypore fungus *Fomes fomentarius* on standing *Betula* sp. trees, collected 11.iii.2007), 1 ♀, 2 ♂ in alcohol [UCRC]. Utrecht, Bornia, 52°4'27.05"N 5°18'17.19"E, 6.vii.2007, L.G. Moraal (from *Fomes fomentarius* on *Betula* sp. trees, collected 18.iii.2007), 1 ♀, 1 ♂ in alcohol [UCRC].
Description Female (holotype and paratypes). **Length** (of dry specimens): 500-700. *Color*: Body brown, appendages pale brown to brown. **Head** Flattened, about as long as wide in dorsal view, trapezoidal in lateral view, rounded and a little wider than high in anterior view, and about as wide as mesosoma. Vertex large, smooth; ocelli absent; ocellar setae weak, short. Transverse trabecula at lower level of eye. Face subquadrate, small, faintly sculptured, with one seta near inner lower side of each torulus; torulus large, subtriangular, slightly below lower level of eyes, close to transverse trabecula and almost touching preorbital trabecula. Mandible bidentate. Antenna (figure 3A) with scape smooth; radicle well differentiated, about 2.4 × as long as wide; remainder of scape about 4.0 × as long as wide. Pedicel smooth, about 1.8 × as long as wide, much longer than F1. F1 subglobular, much shorter than following funicular segments and without longitudinal sensilla; F2-F5 cylindrical or subcylindrical, F6 a little wider; F2-F6 subequal in length, each with 1 longitudinal sensillum; clava notably shorter than F4-F6 combined, entire, 3.7-3.8 × as long as wide, with 6 longitudinal sensilla. **Mesosoma** Mostly smooth except axilla with a faint sculpture. Pronotum a little shorter than mesoscutum, each lobe of pronotum with at least 6 short setae. Mesoscutum much wider than long, its midlobe with a pair of adnotaular setae. Axilla with 1 seta. Scutellum a little shorter than mesoscutum, placoid sensilla near anterior margin of scutellum. Metanotum narrow, strap-like and hardly noticeable, with 2 very weak setae at anterior margin. Propodeum very long, longer than mesoscutum or scutellum. Mesophragma broadly U-shaped, almost extending to posterior margin of propodeum. Rarely apterous. In rare brachypterous individuals, wings greatly reduced, with forewing and hind wing blades extending to just past apex of venation and marginal setae absent; forewing blade with a single long seta. Forewing (figure 3B) in fully winged individuals (the vast majority of specimens) 9.4-10.1 × as long as wide, with venation typical of the genus; hypochaeta almost extending to posterior margin, both macrochaetae rather short and weak; blade notably infuscate throughout (with brown), with one subapical, incomplete, median row of 5 to 8 setae and two more or less complete rows of microtrichia along margins; longest marginal cilia 4.2-4.5 × greatest width of wing. Hind wing (figure 3C) in fully winged individuals narrow, about 22 × as long as wide; blade notably infuscate throughout (with brown), with one subapical, incomplete, median row of setae and a more or



3. *Cleruchus polypori* sp. nov., female (holotype). A: antenna; B: forewing (normal, not reduced); C: hind wing (normal, not reduced). Scale bars = 0.1 mm.
3. *Cleruchus polypori* sp. nov., vrouwtje (holotype). A: antenne; B: voorvleugel (normaal, niet gereduceerd); C: achtervleugel (normaal, niet gereduceerd). Maatstreep = 0.1 mm.



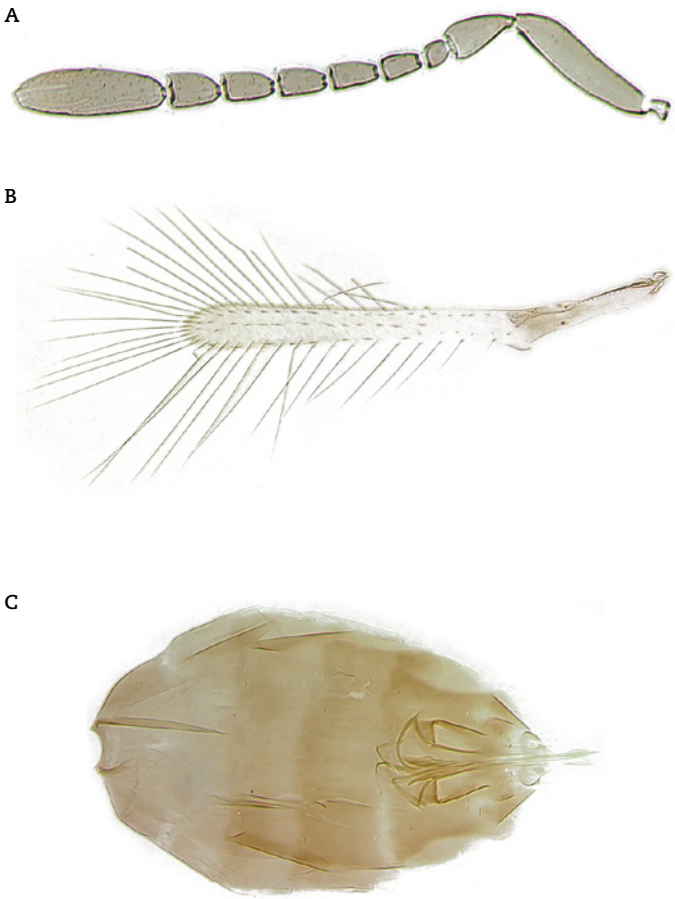
4. *Cleruchus polypori* sp. nov., male (paratype). A: Antenna; B: Genitalia. Scale bars = 0.1 mm.
4. *Cleruchus polypori* sp. nov., mannetje (paratype). A: antenne; B: genitalia. Maatstreep = 0.1 mm.

less complete row of microtrichia along anterior margin; longest marginal cilia 7.0-7.4 × greatest width of wing. **Metasoma** Petiole very short but well visible in slide-mounted specimens, about 1.5 × as wide as long. Gaster elongate, longer than mesosoma; ovipositor 1.4-1.5 × length of metatibia and 1/2-3/5 length of gaster, notably exserted beyond its apex (by about 3/10-1/3 of ovipositor length).
Measurements of the holotype **Body** 743; head: 128; mesosoma: 228; metasoma: 387; ovipositor: 212. Antenna: radicle: 29; rest of scape: 105; pedicel: 45; F1: 15; F2: 42; F3: 40; F4: 40; F5: 42; F6: 41; clava: 103. Forewing: 576/57; longest marginal seta: 255. **Hind wing** 515/23; longest marginal seta: 161. **Legs** (given as coxa, femur, tibia, tarsus): fore 70, 115, 100, 113; middle 52, 106, 112, 110; hind 73, 116, 155, 119.
Male (paratypes) **Length** (of dry specimens): 430-630. Similar to female except for the normal sexually dimorphic characters and the following. Antenna (figure 4A) 13-segmented; scape (without radicle) 3.4-3.6 × as long as wide; F1 subglobular, much shorter than following flagellomeres, without longitudinal sensilla; F2-F10 subequal in length, F11 the longest of flagellar segments, F2-F11 usually with 2 longitudinal sensilla each (F3 sometimes without). Apterous. Genitalia as in figure 4B.
Diagnosis Both sexes of *C. polypori* sp. nov. have elongate, brown bodies and lack ocelli. Its females are mostly fully winged, rarely brachypterous or apterous, while males are apterous. Female of this new taxon can be distinguished from female of *C. pieloui*, to which *C. polypori* is most similar, and which has a similarly elongate body and also lacks ocelli, in having F2-F6 more elongate (the clava is notably shorter than F4-F6 combined). F2-F6 of the female antenna of *C. pieloui* are relatively shorter (the clava is notably longer than F4-F6 combined) (Yoshimoto 1971). Both sexes of *C. pieloui* are apterous (Yoshimoto 1971). *Cleruchus pieloui* is also very similar to *C. puchus* sp. nov. from Contra Costa County, California, USA, whose fully winged females lack the ocelli and have somewhat similar antennae to *C. pieloui*, but the clava is about as long as F4-F6 combined. The ovipositor of *C. puchus* is much shorter (about the length of metatibia) than in *C. polypori* (1.4-1.5 × length of metatibia). In addition, *C. polypori* differs from *C. mikhail* Triapitsyn 2002 and from *C. petr* Triapitsyn 2002, described from the Russian Far East (Triapitsyn 2002), in lacking the ocelli; the female antenna and wings of *C. petr* are somewhat similar to those of *C. polypori* but *C. petr* has a short, fused radicle and its ovipositor is not exserted beyond the gastral apex. *Cleruchus polypori* is so different from all other described European species of this genus that it would not key to any of them in the key by Novicky (1965). The elongate body of *C. polypori* is somewhat similar to that of *C. leptosoma* Debauche 1948 from Belgium, but the latter species has ocelli, and also the funicular segments of its female antenna are more compact while the flagellum of its male antenna is 10-segmented (Debauche 1948).
Etymology The specific name refers to the polypore fungi, where the apparent beetle hosts of this new taxon live and from which specimens of *C. polypori* were reared.
Hosts Most of the fruiting bodies of the polypore fungus host of *C. polypori*, *Fomes fomentarius* on *Fagus sylvatica* trees, were infested with the beetles *Cis castaneus* Mellié 1848, *C. nitidus* Fabricius 1792, and *Ennearthron cornutum* (Gyllenhal 1827) (Coleoptera: Ciidae), which were reared in climate chambers at 20°C during mid July to mid November 2006. Thus, these beetles are the likely hosts of this newly described mymarid taxon.

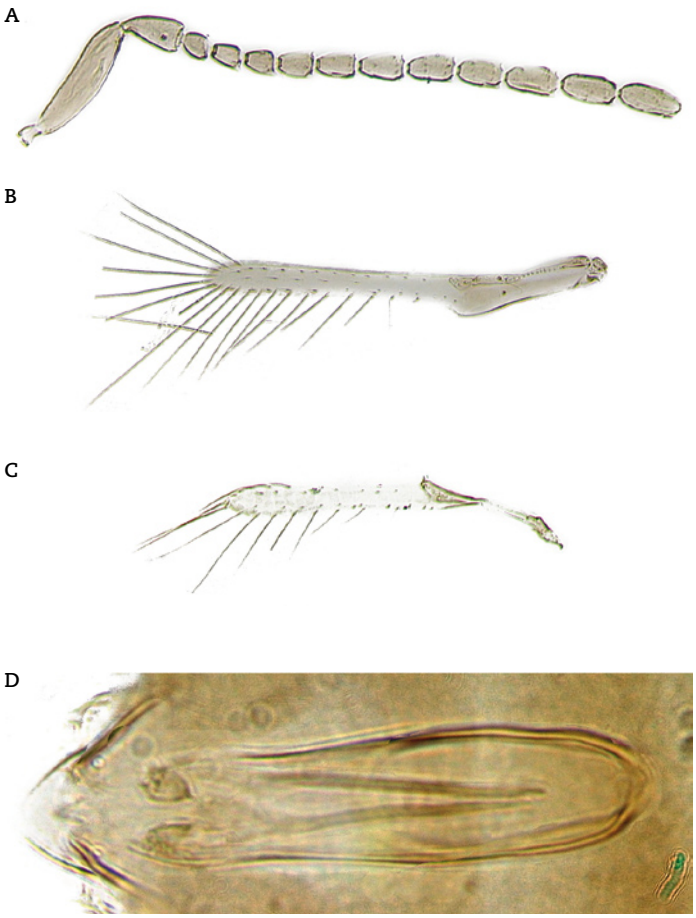
Cleruchus pieloui (Yoshimoto 1971)

Cleruchus sp.: Pielou & Verma 1968: 1187.
Paracleruchus pieloui Yoshimoto 1971: 1079-1082.
Cleruchus pieloui (Yoshimoto): Schauff 1984: 44.

Type locality Ludlow, New Brunswick, Canada, according to Yoshimoto (1971), but Pielou & Verma (1968) indicated a more precise locality for their collections in New Brunswick in 1967: Northeast of Ludlow, 46°33'N 66°14'W.
Comments Although no formal new combination was proposed, it was Viggiani (1974) who *de facto* transferred *Paracleruchus pieloui* to *Cleruchus* as he synonymized the genus *Paracleruchus* Yoshimoto 1971 (with *P. pieloui* as the type species) under *Cleruchus*.
It is quite likely that a winged form of this species also exists, at least among the females (to facilitate their dispersal from one bracket fungus to others). However, it has not yet been discovered.



5. *Cleruchus puchus* sp. nov., female (holotype). A: antenna; B: forewing; C: gaster.
5. *Cleruchus puchus* sp. nov., vrouwtje (holotype). A: antenne; B: voorvleugel; C: abdomen.



6. *Cleruchus puchus* sp. nov., male (paratype). A: antenna; B: forewing; C: hind wing; D: genitalia.
6. *Cleruchus puchus* sp. nov., mannetje (paratype). A: antenne; B: voorvleugel; C: achtervleugel; D: genitaliën.

Cleruchus puchus Triapitsyn, sp. nov.

figures 5 and 6

Type material Holotype female on slide [EMEC], labeled: "USA, California, Contra Costa Co., Morgan Territory Rd., 10 mi SE of Clayton, 22.v.1964, G.I. Stage. Emerged ex. *Polyporus* and Ciidae culture 9-14. vi.1964". Paratypes. Same data as the holotype, 11 ♀, 6 ♂ on 9 slides [EMEC except 1 ♀, 1 ♂ in UCRC and 1 ♀ in USNM] and 4 ♀, 1 ♂ on cards [EMEC except 1 ♀ in UCRC]. USA, California: Contra Costa Co., 14 mi. SE of Clayton, 23.v.1964, G.I. Stage ("ex fungus" except 1 ♀ on separate slide "ex *Polyporus* fungus"), 9 ♀, 10 ♂ on 5 slides [EMEC]. El Dorado Co., 2 mi. N of Placerville, 18.v.1961, J. Lawrence, P. Wygodzinsky ("Lot No. 823, Ex *Polyporus versicolor*", det. by R.L. Doutt in 1964 as *Cleruchus* sp.), 1 ♀ on slide [EMEC]. Santa Barbara Co., Montecito, 6.vii.1975 ("suction trap in oak - woodland"), 1 ♀ on slide [EMEC].

Additional material examined USA, California, Contra Costa Co., Morgan Territory Road, 10 mi. SE of Clayton, 22.v.1964, G.I. Stage ("emerged ex *Polyporus* and Ciidae culture 9-14 June 1964"), 5 ♀, 3 ♂ on 2 slides (incomplete specimens) [EMEC].

Description

Female (holotype and paratypes). **Length** 430-676 (861 in one paratype from El Dorado Co., California. **Color** Body brown, appendages pale or light brown. **Head** Flattened dorsoventrally, a little wider than long in dorsal view, and a little wider than mesosoma. Vertex large, smooth; ocelli absent; ocellar setae weak, short. Transverse trabecula at lower level of eye. Face subquadrate, small, smooth, with one seta near inner lower side of each torulus; torulus large, subtriangular, slightly below lower level of eyes, close to transverse trabecula and almost touching preorbital trabecula. Mandible bidentate. Antenna (figure 5A) with scape smooth; radicle well differentiated, about as long as wide; remainder of scape 3.7-4.5 × as long as wide. Pedicel smooth, 1.7-1.9 × as long as wide, much longer than F1 or any other funicular segment. F1 about as long as wide, shorter than following funicular segments and without longitudinal sensilla; F2-F5 each longer than wide (F5 and F6 the longest and F6 the widest funicular segment), F2 without longitudinal sensilla and F3-F6 each with 1 longitudinal sensillum (occasionally F3 without such sensillum); clava about as long as F4-F6 combined, entire, 2.7-3.2 × as long as wide, with six longitudinal sensilla. **Mesosoma** Mostly smooth except axilla with a faint sculpture. Pronotum a little shorter than mesoscutum, each lobe of pronotum with at least four short setae. Mesoscutum much wider than long, its midlobe with a pair of weak adnotaular setae. Axilla with one weak seta. Scutellum a little shorter than mesoscutum, placoid sensilla near anterior margin of scutellum.
Metanotum narrow, strap-like, with two very weak setae at anterior margin. Propodeum very long, longer than mesoscutum or scutellum. Mesophragma broadly U-shaped, almost extending to posterior margin of propodeum. Forewing (figure 5B) 7.9-10.7 × as long as wide, with venation typical of the genus; hypochaeta almost extending to posterior margin, both macrochaetae rather short and weak; blade notably infuscate throughout (with brown, more so behind venation), with one median row setae and a row of microtrichia along each margin; longest marginal cilia 2.8-3.7 × greatest width of wing. Hind wing narrow, 15-20 × as long as wide; blade notably infuscate (with brown), with one row of microtrichia along anterior margin; longest marginal cilia 4.5-5.3 × greatest width of

wing. **Metasoma** Petiole very short but well visible in slide-mounted specimens, about 1.5 × as wide as long. Gaster (figure 5C) elongate, longer than mesosoma; ovipositor about the length of metatibia and about 3/10 length of gaster, notably exserted beyond its apex (by about 1/4-3/10 of ovipositor length).

Measurements of the holotype: Body: 633; head: 123; mesosoma: 196; metasoma: 314; ovipositor: 136. Antenna: radicle: 13; rest of scape: 106; pedicel: 46; F1: 16; F2: 26; F3: 31; F4: 30; F5: 33; F6: 33; clava: 98. Forewing: 439/45; longest marginal seta: 167. Hind wings and most of leg segments are missing.

Male (paratypes). **Length** (of dry specimens): 443-615. Similar to female except for the normal sexually dimorphic characters and the following. Antenna (figure 6A) 13-segmented; scape (without radicle) 3.7-3.8 × as long as wide; F1 slightly shorter than F2 and F3; following flagellomeres gradually increasing in length (F11 the longest of flagellar segments), F1-F3 with one or two longitudinal sensilla each; F4-F8 with at least two longitudinal sensilla each, and F9-F11 with at least three longitudinal sensilla each. Often brachypterous. In more or less fully winged individuals, forewing (figure 6B) 9.0-12.5 × as long as wide, longest marginal cilia 4.5-5.5 × greatest width of wing, with blade notably infumate; hind wing (figure 6C) usually at least somewhat reduced, with blade infumate (more notable apically). Genitalia as in figure 6D.

Diagnosis Both sexes of *C. puchus* sp. nov. have elongate, brown bodies, lack the ocelli, and females are fully winged while males are either fully winged or, often, brachypterous.

Females of this new taxon can be distinguished from the females of *C. pieloui*, to which *C. puchus* is most similar (however, both sexes of *C. pieloui* are apterous), by the antennal clava that is about as long as F4-F6 combined [in *C. pieloui* the clava is notably longer than F4-F6 combined (Yoshimoto 1971)]. *Cleruchus puchus* is also somewhat similar to *C. polypori* sp. nov. from The Netherlands, from which it differs by the proportions of the female antennal segments and a much shorter ovipositor, as indicated in the key and the diagnosis of *C. polypori*.

Etymology The specific name (a noun in apposition) is an arbitrary combination of letters.

Hosts As indicated on the labels of most of the specimens of the type series, they "emerged ex *Polyporus* and Ciidae culture" and thus are likely egg parasitoids of an undetermined species of Ciidae. The identification of the host bracket fungus as "*Polyporus*" is untrustworthy. One paratype specimen of *C. puchus* from El Dorado County, California, was reared from the bracket fungus *Trametes versicolor*.

Acknowledgments

Vladimir V. Berezovskiy (UCRC) mounted the specimens, Ludmila V. Kuzina (UCRC) made the line drawings, and Jennifer Walker (UCRC) took the digital photographs and arranged them in plates. We thank Robert L. Zuparko (EMEC) for the loan of material. For the Dutch material, we thank Oscar Vorst (NEV) for identification of the beetles and Mirjam Veerkamp (NMV) for identification of the fungi.

References

Debauche HR 1948. Etude sur les Mymarommidae et les Mymaridae de la Belgique (Hymenoptera Chalcidoidea). Mémoires du Musée Royal d'Histoire Naturelle de Belgique 108: 1-248.

Enock F 1909. XI. - New genera of British Mymaridae (Haliday). The Transactions of the Entomological Society of London, Part 4 (1909-1910): 449-459, pl. XII-XV.

Gibson GAP 1997. Chapter 2. Morphology and terminology. In: Annotated keys to the genera of Nearctic Chalcidoidea (Hymenoptera) (Gibson GAP, Huber JT & Woolley JB eds): 16-44. NRC Research Press, Stad.

Huber JT 1986. Systematics, biology, and hosts of the Mymaridae and Mymarommatidae (Insecta: Hymenoptera): 1758-1984. Entomography 4: 185-243.

Huber JT 1997. Chapter 14. Mymaridae. In: Annotated keys to the genera of Nearctic Chalcidoidea (Hymenoptera) (Gibson GAP, Huber JT & Woolley JB eds): 499-530. NRC Research Press, Stad.

Jagers op Akkerhuis GAJM, Moraal LG, Veerkamp MT, Bijlsma RJ, Vorst O & van Dort K 2007. [The role of dead wood spots for the biodiversity of the forest]. Alterra-report 1435, Wageningen. (In Dutch).

Novicky S 1965. Übersicht der Arten der Gruppe *Cleruchus* Enock (Chalc., Mymar.) mit Beschreibungen neuer Arten aus Europa. Zeitschrift für Angewandte Entomologie 56: 56-60.

Pielou DP & Verma AN 1968. The arthropod fauna associated with the birch bracket fungus, *Polyporus betulinus*, in eastern Canada. The Canadian Entomologist 11: 1179-1199.

Schauff ME 1984. The Holarctic genera of Mymaridae (Hymenoptera: Chalcidoidea). Memoirs of the Entomological Society of Washington 12: 1-67.

Triapitsyn SV 2002. Review of the Mymaridae (Hymenoptera, Chalcidoidea) of Primorskii krai: genera *Cleruchus* Enock and *Stethynium* Enock. Far Eastern Entomologist 122: 1-13.

Triapitsyn SV & Huber JT 2000. 51. [Fam. Mymaridae - mymarids]. In: [Keys to the insects of Russian Far East], Volume IV, Part 4. Dal'nauka: 603-614. (In Russian).

Viggiani G 1974. Notizie sui mimaridi terricoli, con proposte sinonimiche per il genere *Cleruchus* Enock. Bollettino della Società Entomologica Italiana 3/4: 86-88.

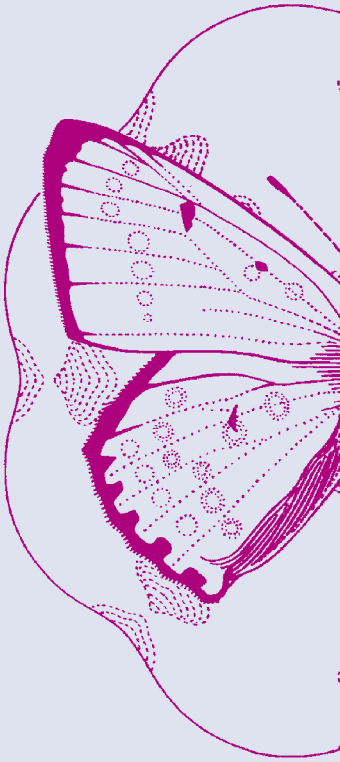
Yoshimoto CM 1971. A new genus of mymarid wasp (Hymenoptera, Chalcidoidea: Mymaridae) from New Brunswick, Canada. The Canadian Entomologist 8: 1079-1082.

Ontvangen: 28 september 2007
Geaccepteerd: 14 januari 2008

Samenvatting

Twee nieuwe *Cleruchus*-soorten (Hymenoptera: Mymaridae) uit Nederland en California (VS), kennelijk geassocieerd met Ciidae (Coleoptera) in tonderzwammen

Gedurende de laatste twee decennia laten terreinbeheerders steeds meer verzwakte en dode bomen in het bos achter om de biodiversiteit te verhogen. De echte tonderzwam, *Fomes fomentarius,* is een zwakteparasiet, die zich vestigt op verzwakte beuken en berken. In de tonderzwam kan zich een heel specifieke entomofauna ontwikkelen. Om hierin inzicht te krijgen, werden in 2006 op zeven locaties in totaal 70 vruchtlichamen verzameld die individueel in afgedekte trechters op vangpotten werden geplaatst. In de vangpotten werd een nog onbeschreven Mymaridae-soort aangetroffen. Deze nieuwe soort, *Cleruchus polypori*, genoemd naar de polypore tonderzwam, parasiteert vermoedelijk de eitjes van de *Cis*-soorten die in de zwam leven. Aanvullend werden vruchtlichamen van *F. fomentarius* van berken verzameld en ook hieruit werden exemplaren van *C. polypori* gekweekt. Van *C. polypori* zijn de meeste vrouwtjes gevleugeld terwijl de mannetjes ongevleugeld zijn. In dit artikel wordt tevens een andere nieuwe Mymaridae uit Californië (VS) beschreven. Het gaat om de verwante soort *Cleruchus puchus*. Van deze soort zijn juist de vrouwtjes gevleugeld en hebben de mannetjes volledige of gereduceerde vleugels. De laatste soort is gekweekt uit eitjes van *Cis*-kevertjes uit zwammen van *Polyporus* sp. en *Trametes versicolor*. Een determinatiesleutel wordt gegeven voor drie *Cleruchus*-soorten die kennelijk geassocieerd zijn met Ciidae in tonderzwammen (Polyporales: Fomitopsidaceae). Verder wordt informatie gegeven over de Mymaridae-soort *Camptoptera aula*, die in 2007 in Nederland gekweekt is uit de zwammen *Ganoderma* sp. op beuk, *Daedaleopsis confragosa* op lijsterbes en *Piptoporus betulinus* op berk. *Camptoptera aula* is een nieuwe soort voor de Nederlandse fauna.



Serguei V. Triapitsyn
Entomology Research Museum
Department of Entomology
University of California
Riverside, CA 92521
USA
serguei@ucr.edu

Leen G. Moraal
Centre for Ecosystem Studies
Alterra, Wageningen UR
P.O. Box 47
6700 AA Wageningen
The Netherlands
leen.moraal@wur.nl