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Triaspis curculiovorus sp. n. (Hymenoptera, Braconidae)
from Japan, Parasitizing Acorn Weevils

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Abstract *Triaspis curculiovorus* sp. n. from Japan is described and illustrated with taxonomic remarks and a list of the *Triaspis* species of the eastern Palaearctic Region. The new species is a parasitoid of *Curculio* larvae infesting *Quercus* acorns.

Key words: *Triaspis*; Braconidae; new species; *Curculio*; *Quercus*.

Introduction

The braconid genus *Triaspis* HALIDAY consists of internal larval parasitoids of Coleoptera (especially Bruchidae and Curculionidae) (MARTIN, 1956; TOBIAS, 1986). It has a world-wide distribution, being recorded from all zoogeographical regions (MARTIN, 1956; PAPP, 1984). Up to now, however, no *Triaspis* species was reported from Japan and only eight species of *Triaspis* were listed from the eastern Palaearctic Region (Russia eastwards from the river Yenissei, Mongolia, China northwards from the river Yangtze, Japan and Korean Peninsula) by FAHRINGER (1935), PAPP (1971, 1989) and TOBIAS (1986). They are:

Triaspis caledonicus MARSHALL, 1888: China

flavipes IVANOV, 1899: Korea

fulgens PAPP, 1971*: Mongolia

lugubria ŠNOFLÁK, 1953: Korea, Russia ("Siberia")

minutus PAPP, 1971*: Mongolia

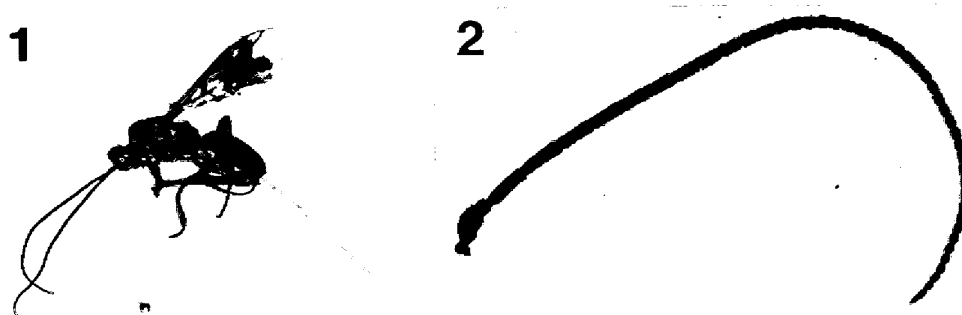
obscurellus (NEES, 1816): Mongolia, Russia ("Siberia")

pallipes (NEES, 1816): China

rimulosus (THOMSON, 1892): China, Mongolia

The ninth *Triaspis* species from the eastern Palaearctic Region was discovered by the junior author, who bred it from its acorn weevil host in Japan, and this

* The two species, *T. fulgens* and *T. minutus*, should be transferred to the genus *Schizoprymnus* FOERSTER because of their almost fused carapace.



Figs. 1–2. *Triaspis curculiovorus* sp. n., female, holotype. — 1, Lateral habitus; 2, antenna, lateral view.

material was sent to the senior author for examination. A description as well as the breeding data, locality, type designation of the new species is given in this paper. The morphological terms used largely follow VAN ACHTERBERG (1975, 1979).

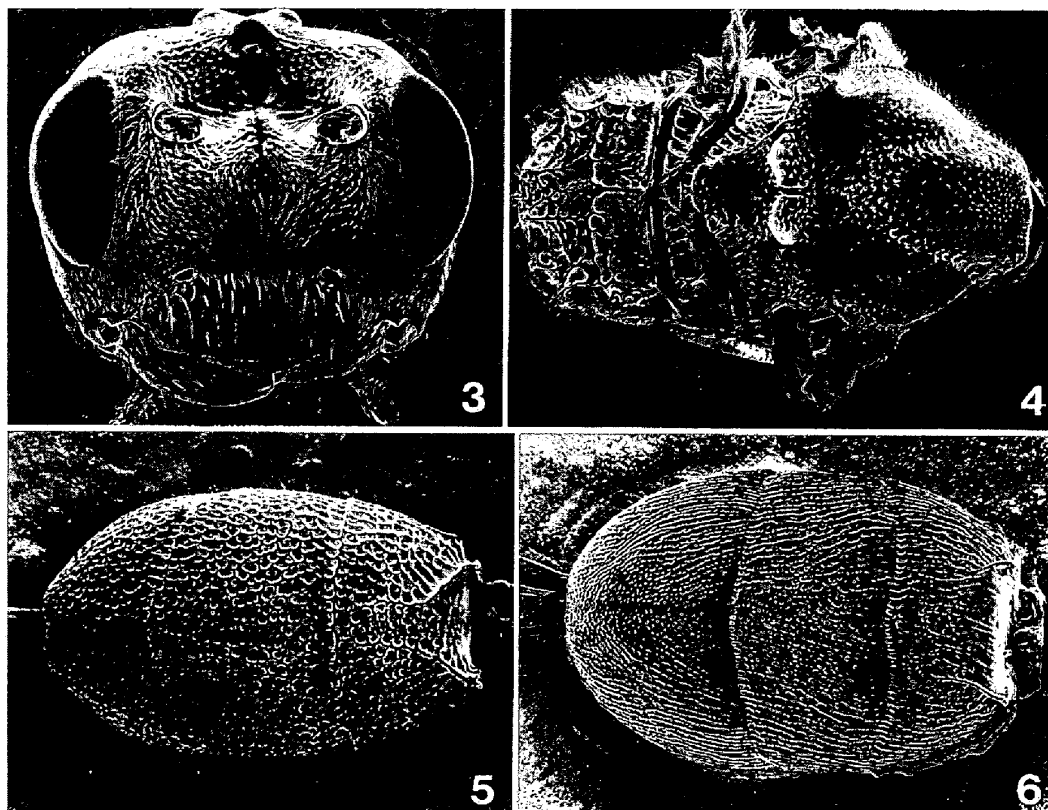
In the cool temperate zone of Japan, acorn weevils of *Curculio* cause the great loss of germinability or viability of *Quercus* seeds (e. g., KANAZAWA, 1975). The new species is the principal parasitoid of the acorn weevils in natural stands of *Quercus mongolica* var. *grosseserrata* in Hokkaido (MAETÔ, in preparation).

Triaspis curculiovorus sp. n.

(Figs. 1–5, 7, 10–16)

Description of the holotype ♀.—Body 5.8 mm long. Head in dorsal view (Fig. 7) transverse, twice as broad as long, eye somewhat protruding and 1.16 times as long as temple, latter rounded, occiput hardly excavated. Ocelli medium sized, elliptic in form, distance between fore and a hind ocelli shorter than and distance between hind two ocelli as long as greatest diameter of a hind ocellus; OOL twice as long as POL. Eye in lateral view 1.7 times as high as wide, widest section of temple behind eye slightly less wide than eye, temple ventrally narrowing (Fig. 10). Face twice as wide as high (cf. Fig. 3). Clypeus wide, just less than three times as wide as high, its lower margin truncated. Tentorial pits nearer to eye than to each other. Malar space as long as basal breadth of mandible. Face densely punctate, clypeus roughly punctate, frons rugose, vertex and temple finely and dispersely punctate, interspaces polished. Antenna long (Figs. 1–2), as long as body, with 46 antennomeres. First and second flagellomeres four times as long as broad, further flagellomeres gradually shortening so that flagellomeres 13–14 to 39–40 cubic and slightly attenuating, penultimate 2–3 flagellomeres 1.2–1.5 times as long as broad (Fig. 2). Ultimate flagellomere three times as long as broad basally, apically pointed.

Mesosoma in lateral view 1.65 times as long as high. Pronope absent. Three lobes of mesonotum finely punctate, interspaces polished and more or less greater



Figs. 3-6. 3-5, *Triaspis curculiovorus* sp. n., female, paratype; 6, *T. thoracicus* (CURTIS), female (Hungary). — 3, Head, frontal view; 4, mesosoma, dorsal view; 5-6, metasomal carapace, dorsal view.

than punctures (cf. Fig. 4). Notaulix deep and crenulated; median lobe behind (*i. e.*, at meeting of pair of notaulices) roughly punctate. Scutellum polished, with fine and disperse hair-punctures. Mesopleuron similar to scutellum, sternaulex wide, crenulated. Propodeum scrobiculate, with an anterior transverse and a pair of posterior longitudinal carinae (cf. Fig. 4). Hind coxa finely punctate. Hind femur 3.35 times as long as broad, broadest at its middle. Hind tibia about one-third longer than hind tarsus. Hind basitarsus as long as tarsal segments 2-3. Hind claws with a large basal lobe (Fig. 13).

Fore wing as long as body. Pterostigma (Fig. 11) just less than three times as long as wide, issuing radial vein distally from its middle, r_1 (r) just more than half as long as width of pterostigma, r_2 ($3-SR+SR_1$) arcuate and ending far before tip of wing, radial cell (R) along metacarpal vein ($1-R_1$) slightly longer than length of pterostigma. Second section of metacarpal vein ($2-R_1$) one-third of first section ($1-R_1$). Discal cell (D_1) one-third wider than high, nervulus ($cu-a$) postfurcal, d_1 ($1-Cu_1$) very short. In hind wing, first section of mediellus ($M+Cu$) 1.4 times as long as second section ($1-M$), nervellus ($cu-a$) faintly sigmoid (Fig. 12).

Carapace (the fused, first three tergites of metasoma) in lateral view as long

as mesosoma, in dorsal view 1.6 times as long as broad, broadest at its middle, evenly rugose with scabrous elements (cf. Fig. 5). Metasomal sutures 1 and 2 distinct, finely crenulated. First tergite 1.57 times as wide behind as long medially, pair of moderately converging keels extending to fore half of tergite. Surface between keels coriaceous, though close along keels roughly sculptured. Second tergite transverse, 1.5 times as broad as long. Third tergite 2.4 times as broad basally as long medially, with wide lateral flange emarginated apically (Figs. 15–16). Ovipositor sheath long, one-fourth longer than body. Ovipositor apically without notch.

Body black, legs vivid brownish yellow. Antenna black, scape below, pedicel almost entirely brownish yellow, flagellomeres 10–12 below faintly brownish yellow. Mandible and labrum brownish yellow, palpi lighter brownish yellow. Tegula brownish yellow. More than distal half of hind tibia black, hind tarsus also black though base of every segment brownish yellow. Ovipositor sheath black, ovipositor brownish testaceous. Wings subfumous. Pterostigma black, veins dark to blackish.

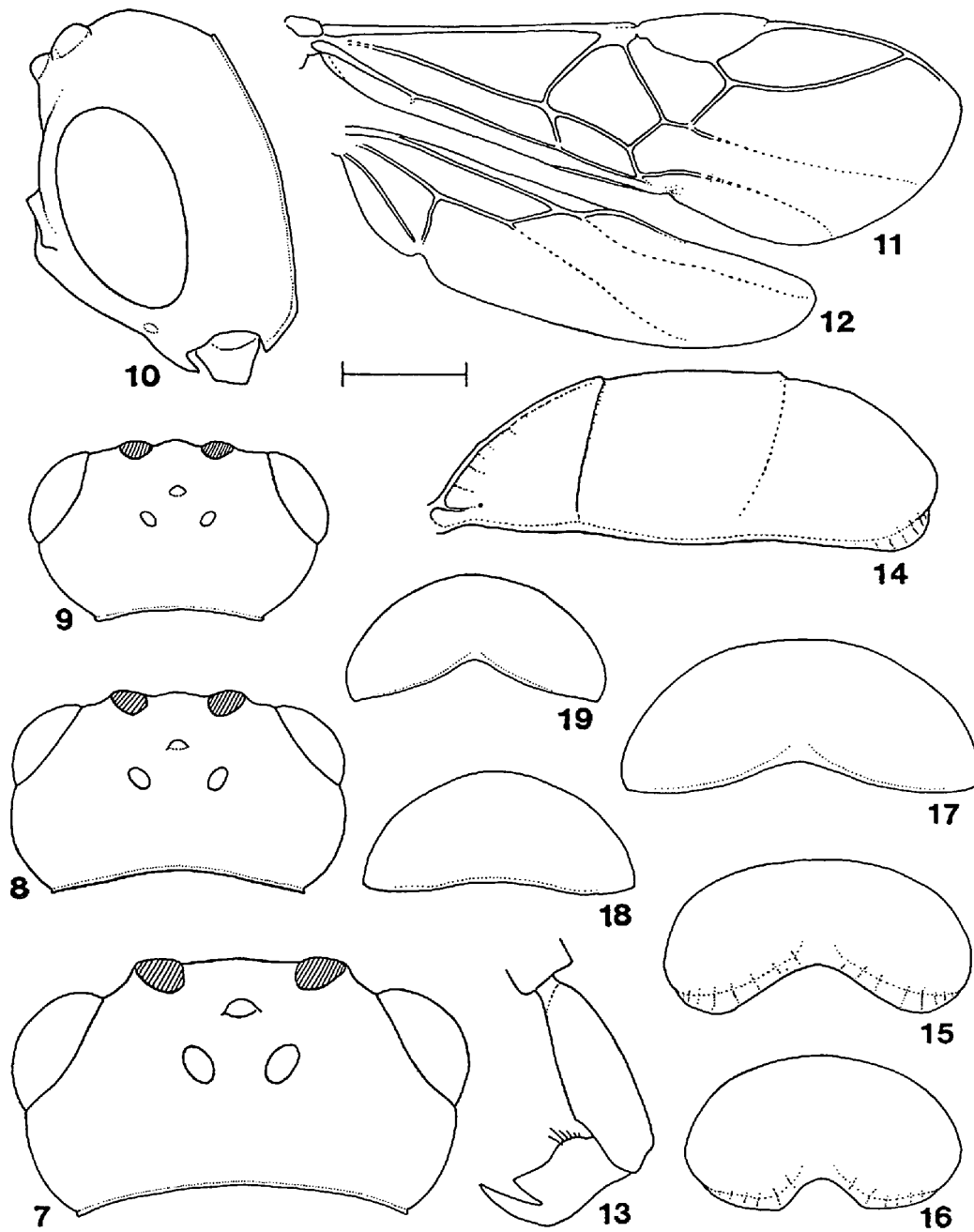
Description of the female paratypes (6 ♀♀).—Similar to holotype. Body 5.8–6.0 mm long. Head in dorsal view 1.9 times (1 ♀) and 2.0 times (5 ♀♀) as broad as long. Antenna with 46 (3 ♀♀), 47 (1 ♀) and 48 (1 ♀) antennomeres (antenna of 1 ♀ damaged). Hind femur 3.12 to 3.57 times as long as broad.

Description of the male paratypes (3 ♂♂).—Similar to female. Body 5.8–6.0 mm long. Head in dorsal view slightly more transverse, 1.97–2.1 times as broad as long. Antenna one-fifth longer than body, with 44 (1 ♂) and 46 (1 ♂) antennomeres (antenna of 1 ♂ damaged). Every flagellomere longer than broad, first and second flagellomeres four times, further flagellomeres gradually shortening so that penultimate flagellomere 1.6 times as long as broad. Hind femur 3.2 times (1 ♂), 3.3 times (1 ♂) and 3.6 times (1 ♂) as long as broad. Apical rim of third metasomal tergite rather narrowly emarginate (Fig. 16). Scape and pedicel either almost entirely black(-ish) (2 ♂♂) or brownish yellow, scape with blackish tint (1 ♂).

Holotype ♀ (Fig. 1). “Sapporo, Hokkaido, Japan, 29. viii. 1990, K. MAETÔ leg.”, “Host: Acorn weevil *Curculio* sp. on *Quercus alba*”. Deposited in the Laboratory of Insect Systematics, National Institute of Agro-Environmental Sciences, Tsukuba, Japan.

Paratypes (6 ♀♀, 3 ♂♂). Same locality as holotype, 1 ♂ (25. vii. 1990), 1 ♀ and 1 ♂ (15. viii. 1990), 1 ♂ (16. viii. 1990) and 1 ♀ (21. viii. 1990), ex *Curculio* sp. (host's food plant *Quercus mongolica* var. *grosseserrata*), K. MAETÔ; same locality, 2 ♀♀ (23. viii. 1990), ex *Curculio* sp. (host's food plant *Quercus alba*), K. MAETÔ; same locality, 1 ♀ (26. viii. 1990) and 1 ♀ (29. viii. 1990), K. MAETÔ. Three paratypes (2 ♀♀ 1 ♂) are deposited in Budapest, Természettudományi Múzeum, Hym. Typ. Nos. 7370–7372, and the others are deposited in Sapporo, Hokkaido Research Center of Forestry and Forest Products Research Institute.

Hosts. Reared from the larvae of *Curculio* spp. (Curculionidae) on *Quercus*



Figs. 7-19. 7, 10-16, *Triaspis curculiovorus* sp. n., female, holotype (7, 10-15), and male, paratype (16); 8, 17-18, *T. thoracicus* (CURTIS), female (8, 17) and male (18) (Hungary); 9, 19, *T. striatulus* (NEES), female (Hungary). — 7-9, Head, dorsal view; 10, head, lateral view; 11, fore wing; 12, hind wing; 13, hind claw; 14, metasomal carapace, lateral view; 15-19, apex of carapace, posterior view. Scale line=0.2 mm (13), 0.4 mm (7-10, 17-19), 0.6 mm (14-16), 1.0 mm (11-12).

Table 1. Adult emergence of *Triaspis curculiovorus* sp. n. and its presumed host weevils.¹⁾

Host plant	Emergent species	No. of emerged adults		
		1990	1991	1992
<i>Quercus mongolica</i> var. <i>grosseserrata</i>	<i>T. curculiovorus</i>	5	1	0
	<i>C. sikkimensis</i>	0	18	1
	<i>C. distinguendus</i>	0	2	0
<i>Quercus alba</i>	<i>T. curculiovorus</i>	6	1	0
	<i>C. sikkimensis</i>	0	13	1

1) *Curculio* larvae which crawled out from the acorns collected at Histsujigaoka, Sapporo, in September 1989 were kept in unglazed pots.

mongolica var. *grosseserrata* and *Q. alba*. After the emergence of *T. curculiovorus*, adults of *Curculio sikkimensis* (HELLER) and *C. distinguendus* (ROELOFS) appeared from the same stocks of *Curculio* larvae which crawled out from acorns of the *Quercus* species (Table 1).

Distribution. Japan (Hokkaido).

Etymology. The specific name "*curculiovorus*" refers to the host's generic name *Curculio*.

Remarks. *Triaspis curculiovorus* sp. n. is characterized by its long antenna, which is as long as (♀♀) or longer than (♂♂) body with 46–48 (♀♀) 44–46 (♂♂) antennomeres, and the long ovipositor (its sheath one-fourth longer than body). It is also distinctive on account of its rugose carapace with wide lateral flange emarginated apically.

It resembles *T. thoracicus* (CURTIS, 1862) from Europe, America and Australia and *T. striatulus* (NEES, 1816) from Europe in having a long ovipositor sheath (distinctly longer than metasoma), carapace with more or less emarginated apical rim and reddish yellow legs. Their specific distinction is as follows:

<i>T. curculiovorus</i>	<i>T. thoracicus</i>	<i>T. striatulus</i>
1. Antenna long, as long as (♀♀) or longer than (♂♂) body, with 46–48 (♀♀) and 44–46 (♂♂) antennomeres.	Antenna short, shorter than (♀♀) or as long as (♂♂) body, with 23–25 antennomeres.	Antenna short, shorter than (♀♀) or as long as (♂♂) body, with 27–28 (♀♀) and 29 (♂♂) antennomeres.
2. Temple in dorsal view more or less shorter than eye, less rounded (Fig. 7).	Temple in dorsal view longer than eye, strongly rounded (Fig. 8)	Temple in dorsal view more or less shorter than eye, more strongly contracted (Fig. 9).
3. Carapace rather elongate, rugose	Carapace broad, longitudinally	Carapace rather elongate, longi-

	with scabrous elements (Fig. 5).	striated with more or less anastomosis (Fig. 6).	tudinally striated.
4.	Apical rim of carapace deeply emarginate (Figs. 15–16).	Apical rim of carapace weakly (♀♀) or indistinctly (♂♂) emarginate (Figs. 17–18).	Apical rim of carapace weakly emarginate (♀♀) (Fig. 19).
5.	Ovipositor sheath long, about one-fourth longer than body.	Ovipositor sheath short, about as long as carapace + half mesosoma.	Ovipositor sheath as long as body.
6.	Body about 6 mm long.	Body 2–4 mm long.	Body 2–4 mm long.

From among the Indo-Australian species of the genus *Triaspis*, the new species is similar to *T. prinops* PAPP, 1984, from Papua New Guinea considering the following common features: 1) body large at least 4 mm long, 2) ovipositor sheath longer than carapace, 3) sculpture of carapace strong, 4) radial cell long, along metacarpal vein (1-R1) longer than length of pterostigma. The distinction between the two species is as follows:

<i>T. curculiovorus</i>	<i>T. prinops</i>
1. Antenna of female long, as long as body, with 46–48 antennomeres.	Antenna of female short, as long as head and mesosoma together, with 26 antennomeres.
2. Face transverse, twice as long as high (Fig. 3).	Face less transverse, 1.45 times as wide as high (fig. 29 in PAPP, 1984).
3. Carapace rugose with scabrous elements (Fig. 5).	Carapace longitudinally and rather strongly striato-rugose.
4. Ovipositor sheath long, about one-fourth longer than body.	Ovipositor sheath short, one-third longer than carapace.
5. Legs vivid brownish yellow.	Legs black.

Taxonomic Remarks

We arranged our new species in the genus *Triaspis* HALIDAY, 1835 (subfamily Calyptinae) on the basis of the following generic features: 1) sutures 1 and 2 of carapace present though less distinct, 2) carapace ventro-apically not incurved at all, 3) carapace in dorsal view usually oval to broad oval in its outline, 4) length of body usually 2–4 mm. The sister-genus, *Schizoprymnus* FOERSTER, 1862, is characterized, on the other hand, by the following features: 1) at most first suture more or less distinct, sutures usually not present, 2) carapace ventro-apically usually

more or less incurved, 3) carapace in dorsal view usually elongate oval, 4) length of body usually 2.5–5.0 mm.

Concerning the new species, our taxonomic scruple refers to its less distinct sutures of the carapace, and to the unusual long body size (5.8–6.0 mm; from among the many *Triaspis* species of the world only a few ones are at most about 4 mm long). These two features become somewhat like those of *Schizoprymnus*, and thus the species is somewhat transitional to this genus. Furthermore, the conspicuously long antenna (*i. e.*, distinctly longer than body and with 44–48 antennomeres) is also a feature different from the usual condition of the *Triaspis* species; the majority of the species have short antenna, shorter than (♀♀) or about as long as (♂♂) body, and the usual number of the antennomeres is 15–30. If a number of species to be discovered in the future have such transitional features (less distinct sutures of carapace and large body size) and conspicuously long antenna, then it may be reasonable to split up the genus *Triaspis* in two or several groups, either subgenera or genera.

Acknowledgement

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