

A Taxonomic Study of the Genus *Aulacocentrum* Brues (Hymenoptera: Braconidae: Macrocentrinae) from Korea

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ABSTRACT

Three species of the genus *Aulacocentrum* Brues (Braconidae: Macrocentrinae) from Korea are recognized and a key is given for the identification. A new species, *Aulacocentrum nigrum* sp. nov. is described, and *A. seticella* van Achterberg and He is reported for the first time from Korea.

Key Words: Taxonomy, Braconidae, Macrocentrinae, *Aulacocentrum*, Korea

INTRODUCTION

Aulacocentrum Brues is a rather small group of the genus with only five species described in the Palaearctic and Oriental regions. Recently He and van Achterberg (1994) reported three species including two new species from China. Among them *A. philippinense* was previously recorded from Korea by Watanabe (1967) and Papp (1982, 1985) under the name *Macrocentrus philippinense*. Here we report further a new species, *A. nigrum* and an unreported species, *A. seticella* van Achterberg and He from Korea.

This genus can be separated from the closely related genus *Macrocentrus* Curtis, by following characters: first metasomal tergites (at least partly) with transversely and semicircularly striate, first tergite 3-8 times longer than its apical width, vein SR of hind wing bent moderately to strongly, vein SC+R1 of hind wing bent abruptly, fore femur moderately long and setose dorsally, somewhat

shorter than ventrally, and inner hind tibial spur 0.3-0.5 times of the length of hind basitarsus (van Achterberg, 1993).

All specimens were collected by light trap. These specimens possessed an ophonoid facies (Gauld and Huddleston, 1976). Most of nocturnal braconids have long legs, yellowish body, large ocelli and eyes. The species of the genus *Aulacocentrum* are mainly solitary endoparasitoids of economically important pyralid larvae (He and van Achterberg, 1994). The terminology used in this paper follows van Achterberg (1988). Specimens examined in this study including the types deposited in the National Institute of Agricultural Science and Technology (NIAST), Rural Development Administration, Suwon, Korea.

SYSTEMATICS

Key to the Korean *Aulacocentrum* species

1. Vein SR of hind wing strongly bent basally, at constriction nearly touching the frontal wing margin (figs. 20, 24); 2-SC+R vertical; marginal cell of hind wing strongly wider basally, basally much wider than apically (fig. 20). ————— *A. seticella*
- Vein SR of hind wing moderately bent basally, at constriction distinctly separated from frontal wing margin (figs. 1, 26); 2-SC+R horizontal; marginal cell of hind wing moderately widened basally, basally almost same as wider as apically (fig. 1). ————— 2
2. Pronotum, mesoscutum, propodeum and metasoma mainly black; flagellum without median pale ring, entirely black; scapus black; 1-SR+M strongly curved medially; all coxae black. ————— *A. nigrum* sp. nov.
- Pronotum and basal half of first-three metasomal tergites yellowish-white, mesoscutum reddish-brown, propodeum at least partly yellowish-white; flagellum with submedian pale ring, scapus at least partly ivory or pale yellow; 1-SR+M slightly curved medially; all coxae yellowish-brown, hind one some darker ————— *A. philippinense*

Aulacocentrum nigrum sp. nov. (Figs. 1-11, 25, 26)

Material examined. Holotype: ♀ (NIAST), Mt. Chiri, Simwon, Kurye, Chollanam-do, Korea, 14-15 VIII 1993, D. S. Ku, at light. Paratypes: 1 ♀ (NIAST), same data as holotype; 1 ♀ (NIAST), Dodong, Ullung-gun, Kyongsangbuk-do, Korea, 27 VIII 1987, J. W. Lee.

Description. Holotype, ♀, body length 8.5 mm, fore wing 7.7 mm.

Head: Antennal segments 44, 3rd antennal segment 1.2 times longer than 4th segment; 3rd, 4th and penultimate segments 7.2, 6.8 and 3.5 times longer than their width, respectively, apical segment with spine (fig. 5); antenna about 1.8 times longer than fore wing; length of maxillary palp 1.5 times height of head; eyes glabrous, eye in dorsal view 11 times longer than temple (fig. 7); temple very narrow, smooth and very strongly roundly narrowed posteriorly (fig. 7); OOL: diameter of ocellus: POL = 6: 7: 8; frons very narrow, smooth and shallowly impressed; vertex smooth; face 0.9 times longer than its width, its surface longitudinally slightly impressed dorso-medially, sparsely

punctulate laterally and more densely punctate medially with long hairs, hairs inwards laterally and forwards medially; gena mainly smooth; clypeus strongly convex (fig. 10), distinctly separated from face and its height 0.7 times longer than wide (fig. 8), sparsely punctate with long hairs, its ventral margin straight; anterior tentorial pits very deep; length of malar space as long as basal width of mandible, smooth; mandible smooth and robust, both teeth acute apically, its outer tooth distinctly longer than inner tooth.

Mesosoma: Mesosoma 1.5 times longer than its height; side of pronotum crenulate medially and posteriorly, remainder largely smooth; prepectal carina complete; precoxal sulcus impressed and densely punctate (fig. 10); mesopleuron and metapleuron rather densely and deeply punctate; metapleural flange large and obtuse, with some rugae; notauli complete, deep, crenulate, and irregularly rugose posteriorly with an incomplete longitudinal median carina (fig. 4); mesoscutal lobes densely punctulate; scutellar sulcus deep, with seven carinae; surface of propodeum densely rugulose-punctate anteriorly, finely and transversely rugose medially.

Wings: Fore Wings: subbasal cell mainly glabrous and with elongate pale yellowish spot subapically (figs. 1, 25); $r:3-SR:SR1 = 7:19:45$; $m-cu:2-SR+M = 18:5$; $2-SR:3-SR:r-m = 15:19:10$; $cu-a$ slightly inclivous, postfurcal, $1-CU1$ 0.3 times of $cu-a$; first subdiscal cell 2.9 times longer than its width, with some setae submedially (fig. 25). Hind wing: marginal cell slightly narrowed medially, widened subbasal part of marginal cell setose dorsally (fig. 26) and moderately setose ventrally; $1r-m:1-M:cu-a = 9:14:5$; $2-SC+R$ longitudinal (fig. 1).

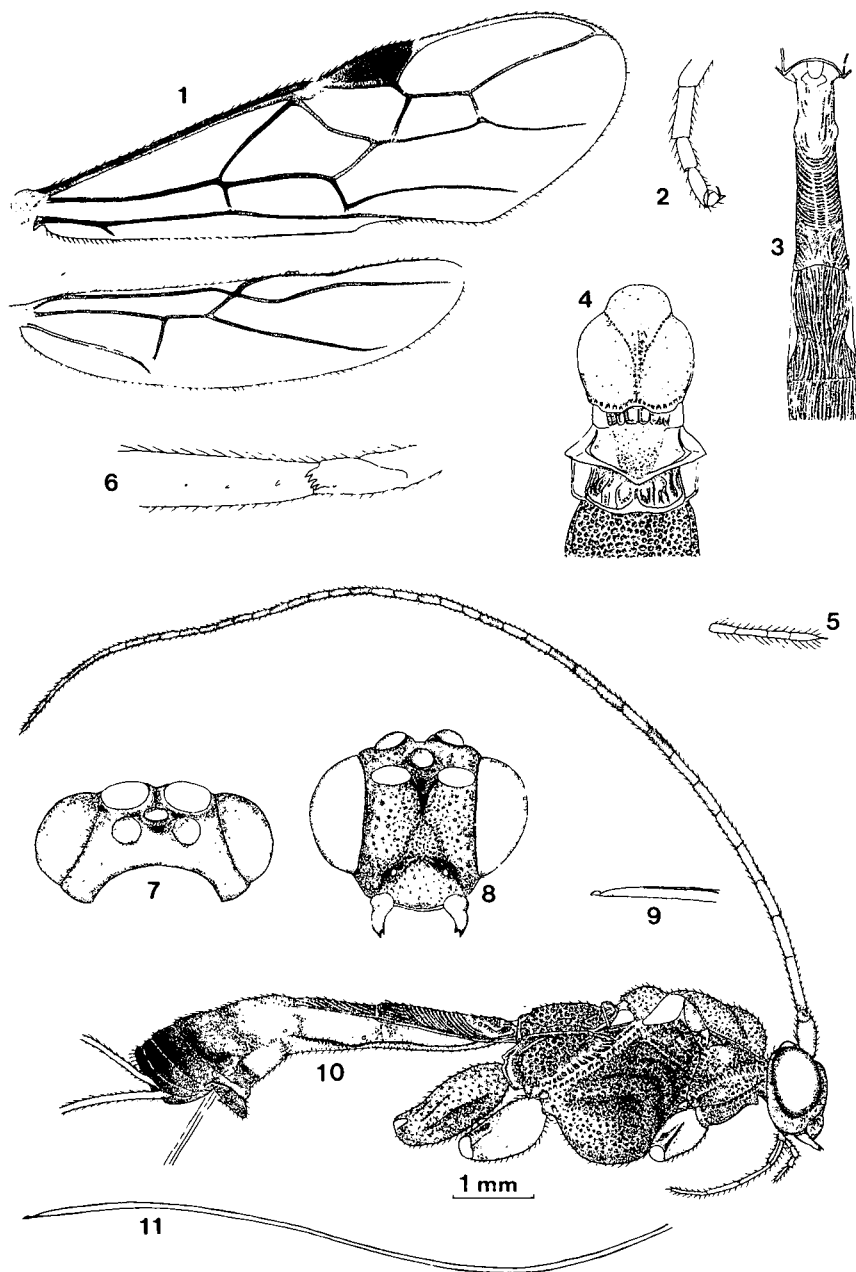
Legs: Hind coxa punctate; tarsal claws with basal lobe (fig. 2); hind trochantellus with five teeth in two rows (fig. 6); hind femur with three teeth basally; femur, tibia and basitarsus of hind leg 8.8, 16 and 10 times longer than their width, respectively; length of hind tibial spurs 0.36 and 0.46 times of hind basitarsus; hind basitarsus as long as second-fifth segments of hind tarsus combined; fore femur 11 times longer than its width.

Metasoma: First tergite 3.7 times longer than its apical width, slightly widened apically, its surface densely and transversely semicircularly striate medially, slightly obliquely striate apically, basally with some longitudinal rugae (fig. 3); second tergite densely and longitudinally striate, its length 1.6 times its apical width; third tergite finely longitudinally striate basally, remainder punctate, third tergite 1.1 times longer than its apical width; ovipositor sheath 1.1 times as long as fore wing; apex of ovipositor rather obtuse, with distinct notch (fig. 9); hypopygium densely setose and nearly smooth.

Color: Black; head black, clypeus dark-red, mandible reddish-brown; palpi brownish-yellow basally, remainder yellowish-white; antennal segments black, apical four or five segments blackish-brown, anellus brown; mesosoma and metasoma black; all tergites black, basal half of sternites dark brown; base of first metasomal tergite yellowish white; wing membrane hyaline; pterostigma and veins blackish-brown, base of pterostigma, parastigma and vein $1-R1$ of fore wing yellowish-brown; legs mainly black, trochanter of fore leg yellowish-brown, femur of fore and middle legs reddish-brown; tibiae and tarsus of fore and middle legs infuscate; hind tibia basally and hind tarsus yellowish-white, telotarsus brownish-yellow; coxae of fore and middle legs blackish-brown, coxa of hind leg black.

Male: Unknown.

Variation (Paratypes) : Body length 9 mm, fore wing 7.5-8 mm long; antennal segments 46; first



Figs. 1-11. *Aulacocentrum nigrum* sp. nov., ♀. 1, wings; 2, hind claw and tarsus; 3, first and second metasomal tergites, dorsal view; 4, mesosoma, dorsal view; 5, apex of antenna; 6, hind trochantellus and base of hind femur, lateral view; 7, head, dorsal view; 8, head, frontal view; 9, apex of ovipositor; 10, habitus, lateral view; 11, ovipositor. 1, 10, 11: 1× scale-line; 3, 4: 1.4×; 2, 5, 6, 7, 8: 2×.

metasomal tergite 3-3.4 times longer than its apical width; scapus reddish-yellow ventrally.

Distribution. Korea (Mt. Chiri, Isl. Ullung).

Host. Unknown.

Etymology. *Nigrum* means black in Latin, because the body of this species is black.

Remarks. This species is easily distinguished from its black body. The morphological characters are close to *A. confusum* He and van Achterberg, 1994, but can be separated as follows:

<i>A. nigrum</i> sp. nov.	<i>A. confusum</i>
1. hind trochantellus with five in two rows	1. hind trochantellus with 5-10 in three rows
2. clypeus basally strongly convex	2. clypeus basally less convex
3. first tergite with distinct longitudinal rugae basally	3. first tergite without distinct longitudinal rugae basally
4. widened basal part of marginal cell of hind wing entirely setose	4. widened basal part of marginal cell of hind wing at least basally glabrous
5. body almost entirely black; mesoscutum and apex of first metasomal tergite of female completely black	5. body brownish-yellow; mesoscutum and apex of first metasomal tergite of female completely yellow

brownish-yellow;

***Aulacocentrum seticella* van Achterberg and He, 1994 (Figs. 12-24)**

Aulacocentrum seticella; He and van Achterberg, 1994: 160, figs. 2-23, 40.

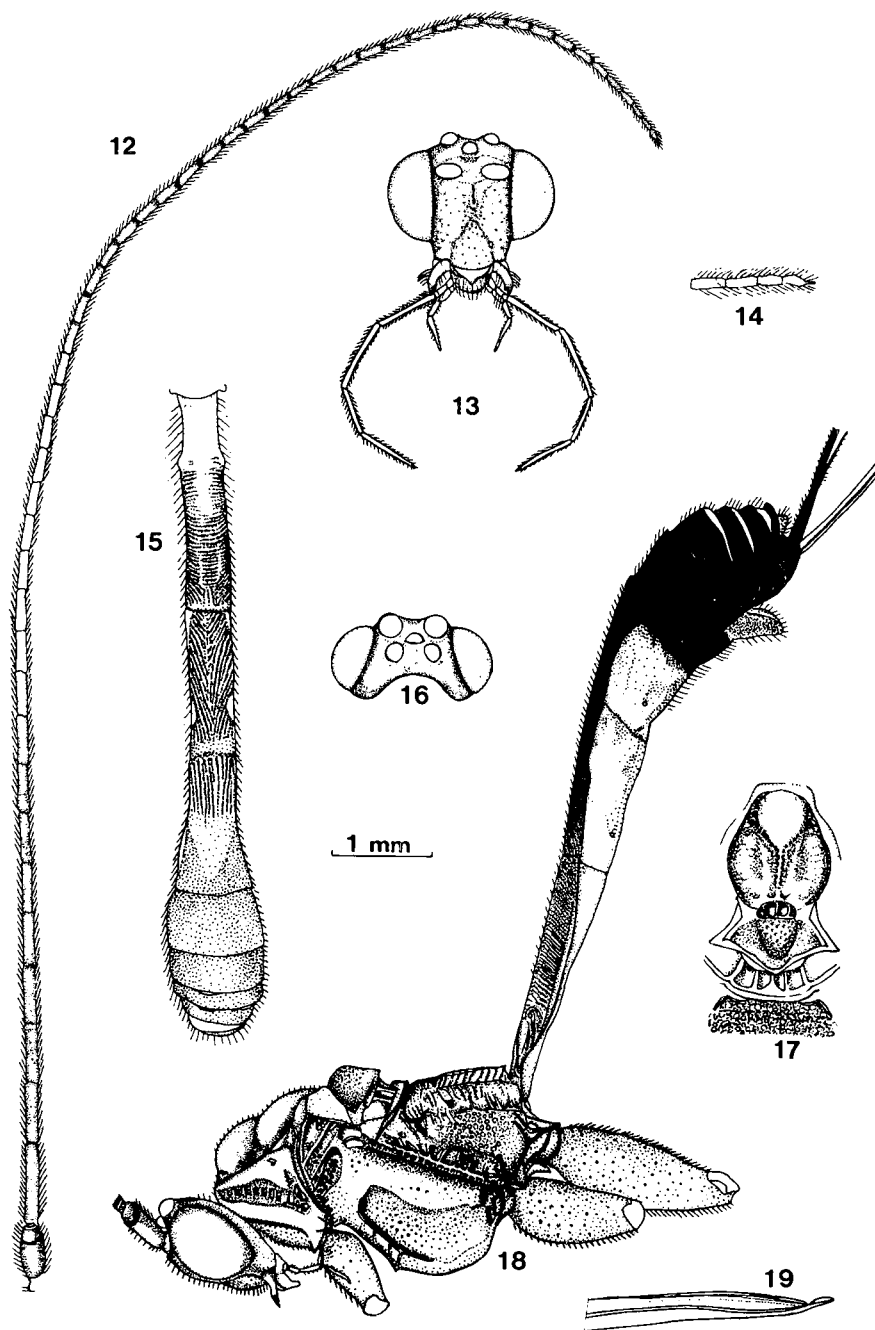
Material examined. 2 ♀ (NIAST), Samsan, Kosong, Kyongsangnam-do, Korea, 19-20 VIII 1993, D. S. Ku, at light.

Description. Body length 9.5-9.6 mm, fore wing 8.2-8.7 mm.

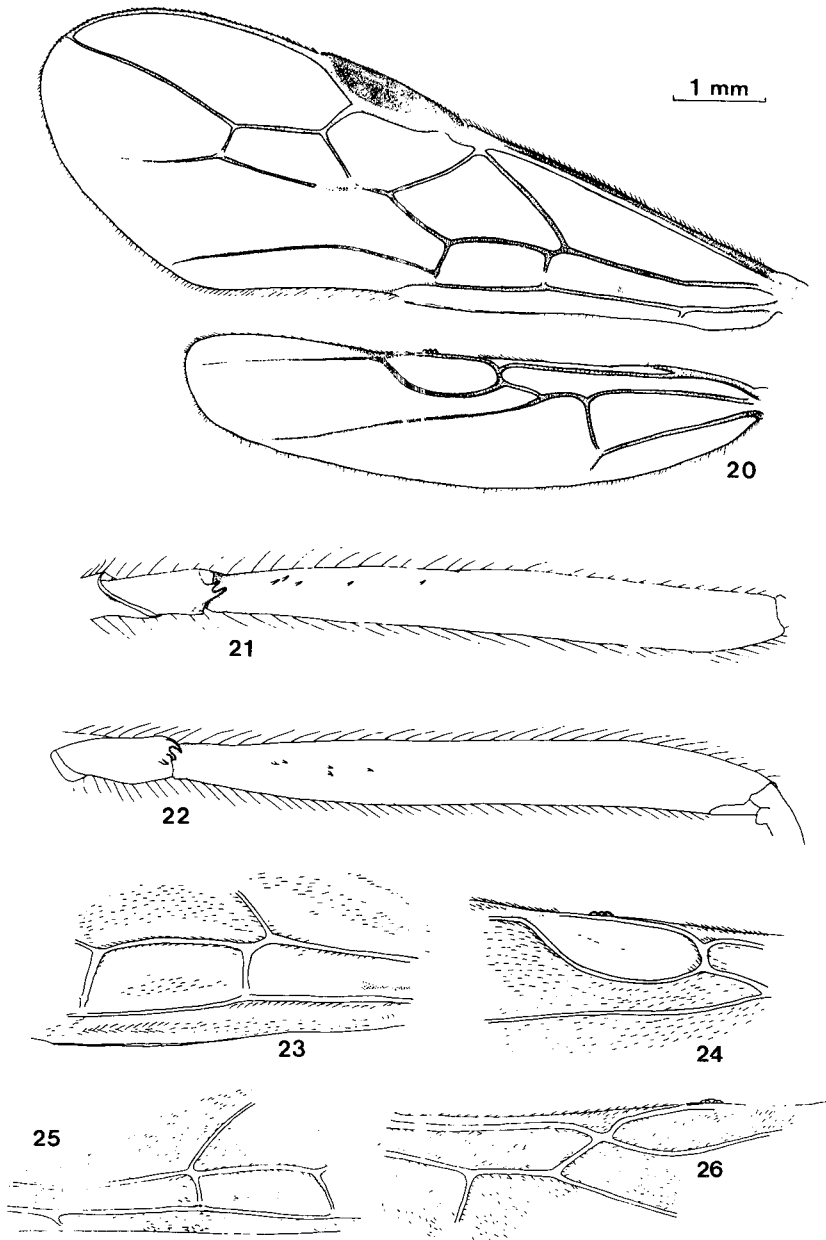
Head: Antennal segments 52-53, 3rd antennal segment 1.25 times longer than 4th segment, 3rd, 4th and penultimate segments 6.3, 6.0 and 3.3 times longer than their width, respectively (fig. 12), apical segment with spine (fig. 14); antenna about twice longer than fore wing; length of maxillary palp 2.0 times of height of head; eye in dorsal view 10 times longer than temple; temple extremely narrow, directly narrowed posteriorly, smooth (fig. 16); OOL:diameter of ocellus:POL = 6:7:8; frons very narrow, smooth, shallowly impressed; vertex smooth; face sparsely punctulate laterally, more densely medially, about as long as wide; clypeus strongly convex, distinctly separated from face (fig. 13) and sparsely punctulate, its ventral margin straight; malar space 1.1 times longer than basal width of mandible; both teeth of mandible acute and its outer tooth longer than inner tooth.

Mesosoma: Mesosoma 1.6 times longer than its height; side of pronotum crenulate medially, remainder mainly smooth; prepectal carina very strong and complete; precoxal sulcus slightly impressed, punctate, with inter spaces about equal to diameter of punctures (fig. 18); mesopleuron somewhat less densely punctate; metapleuron coarsely punctate, near its anterior margin smooth, with some crenulae, and ventrally nearly reticulate; metapleural flange acute, triangular with some rugae; notauli complete, deep, crenulate, posteriorly with a longitudinal median carina (fig. 17); mesoscutal lobes sparsely punctulate; scutellar sulcus deep, with three carinae; surface of propodeum anteriorly rugose-reticulate with punctate, mainly transversely rugose posteriorly (fig. 18).

Wings: Fore Wing: subbasal cell glabrous apically, and with elongate pale yellowish spot (fig. 23);



Figs. 12-19. *Aulacocentrum seticella* van Achterberg and He, ♀. 12, antenna; 13, head, frontal view; 14, apex of antenna; 15, metasomal tergites, dorsal view; 16, head, dorsal view; 17, mesosoma, dorsal view; 18, habitus, lateral view; 19, apex of ovipositor. All 1 × scale-line, but 14: 2 × and 19: 4 ×.



Figs. 20-24. *Aulacocentrum seticella* van Achterberg and He, ♀; figs.

25-26. *Aulacocentrum nigrum* sp. nov., ♀; 20, wings; 21, left hind trochantellus and base of hind femur, lateral view; 22, right hind trochantellus and base of hind femur, lateral view; 23, 25, detail of first subdiscal cell of fore wing, dorsal view; 24, 26, detail of basal half of marginal cell of hind wing, dorsal view. 20, 25: 1 × scale-line; 21, 22: 2 ×; 23, 24, 26: 1.6 ×.

r:3-SR:SR1=11:24:52; m-cu:2-SR+M=20:10; 2-SR:3-SR:r-m=15:24:8; cu-a vertical, distinctly postfurcal, 1-CU1 0.6 times of cu-a; first subdiscal cell about twice as long as wide, with some setae submedially (fig. 23). Hind wing: marginal cell strongly widened basally, its maximum subbasal width 10 times of its minimum width (figs. 20, 24); SR nearly reaching frontal margin of hind wing; widened basal part of marginal cell evenly sparsely setose ventrally, mainly glabrous dorsally (fig. 24); 1r-m:1-M:cu-a = 17:18:21; cu-a vertical, slightly bent towards wing base posteriorly; 2-SC+R vertical (fig. 20).

Legs: Hind coxa punctulate; tarsal claws with basal lobe; trochantellus with two or three teeth in a row (figs. 21, 22); femur, tibia and basitarsus of hind leg 9.4, 17.5 and 11.7 times longer than their width, respectively; hind tibial spurs 0.32 and 0.36 times longer than hind basitarsus; fore femur 14 times longer than its width.

Metasoma: First tergite 4.8-5.6 times longer than its apical width, its surface densely, finely and transversely striate, with some punctures, but in front of spiracles largely smooth, and apically slightly obliquely striate (fig. 15); second tergite finely longitudinally striate, its length about 3.2 times of its apical width; basal half of third tergite longitudinally striate, remainder punctate; ovipositor sheath 1.37 times longer than fore wing; apex of ovipositor obtuse, with distinct notch (fig. 19); hypopygium densely setose (fig. 18).

Color: Yellowish-brown; head, 11 or 12 basal antennal segments (but scapus and pedicellus partly pale brownish), 21st or 22nd and following antennal segments, humeral plate, pterostigma (but basally and narrowly anteriorly yellowish-brown), veins (but vein 1-R1 of following tergites dorsally, apical quarter of metasoma ventrally, and ovipositor sheath, dark brown or blackish; palpi infusate basally, remainder yellowish; 12th or 13th-20th or 21st antennal segments, tegula, fore and middle legs largely, base of first tergite, basal 0.7 of metasoma ventrally, base and apical third of hind tibia, hind tarsus and spurs, pale yellowish or whitish; wing membrane slightly infusate, without distinct patch near vein CU1a of fore wing; thorax mainly orange-brown.

Distribution. Korea, China, Malaysia, Singapore, Indonesia, India.

Host. Parasitoid of *Pachyzancla* sp. (Pyrilidae: Pyraustinae) (He and van Achterberg, 1994).

Remarks. This species is easily recognized from its marginal cell of hind wing (figs. 20, 24). The morphological characters of this species are mostly equal to original description (He and van Achterberg, 1994), but slightly different from Korean materials. It has widened subbasal part of marginal cell of hind wing setose ventrally but glabrous dorsally. This species is recorded for the first time from Korea.

***Aulacocentrum philippinense* (Ashmead, 1904)**

Macrocentrus philippinense Ashmead, 1904: 145; Watanabe, 1967: 5-6, fig. 2; Papp, 1982: 108, 1985: 342.

Aulacocentrum philippinense; van Achterberg and Belokobylskij, 1987: 244, figs. 93-99; van Achterberg, 1993: 6-8, figs. 1-11, 103, 411, 414, 415; He and van Achterberg, 1994: 164-165, figs. 24-26, 41.

Macrocentrus japonicus Watanabe, 1932: 133.

Material examined. Korea: 1 ♀ (NIAST), Mt. Paikun, 27 VIII 1991, H. M. Kwon; 4 ♂ (NIAST),

Chojeon, Chinju, Kyongsangnam-do, 16-17 IX 1993, VI 25-26 1993, 1-2 VII 1993, 23 VII 1994, D. S. Ku, at light.

Previous recorded localities in Korea. Suwon (Watanabe, 1967); Pyongyang, Haeju, Sariwon (Papp, 1982); Mt. Myohyang-san (Papp, 1985).

Distribution. Korea, China, India, Indonesia, Japan, Malaysia, Philippines, Taiwan, Inner Mongolia, Russia (Primoryan rerritory).

Host. Parasitoid of economically important Pyralidae: *Diaphania pyloalis* (Walker), *Pyrausta (Botyodes) diniasalis* Walker, *P. (B.) asialis* (Gu rin-M neville) and *Palpita nigropunctalis* (Bremer) in Watanabe (1967); *Diaphania pyloalis* (Walker), *Cnaphalocrocis medinalis* (Guenee) and *Chilo suppressalis* (Walker) in He and van Achterberg (1994).

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한국산 *Auracocentrum*속의 분류학적 연구

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요 약

한국산 *Auracocentrum*속을 분류한 결과, 3종이 동정되었다. 이들 중 *Auracocentrum nigrum* sp. nov.은 신종이었고, *A. seticella*는 한국미기록종이었다. 이들에 대한 검색표 및 종기재를 하였고, 간단하게 도해하였다.