

## Taxonomic Studies on the Genus *Asca* (Ascidae: Mesostigmata) in Korea II. - Description of Two New Species

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### ABSTRACT

Two species of ascid mites, *Asca kosungensis* n. sp. and *Asca odowdi* n. sp. are described from Korea: The former was collected from soil and the latter from plant leaves.

Key words: Mesostigmata, Ascidae, *Asca*, new species, Korea.

### INTRODUCTION

The genus *Asca* Heyden, 1826 consists of a distinct group of species readily recognised by a pair of conspicuous setae-bearing tubercles (horns) placed on the posterior lateral margin of posterior dorsal shield with the exception of one species *A. acornis* Lindquist, 1972.

The ascid mites occur in a variety of habitats including on plants and in soil, and they are generally considered to be predators of nematodes, phytophagous mites and small insects. Prior to the present study four species have been reported in Korea: *A. nubes* Ishikawa, 1969, *A. aphidioides* (Linne, 1758), *A. sculptrata* Aoki, 1968, and *A. garmani* Hurlbutt, 1963, all of which were collected in soil (Paik, 1983; Lee *et al.*, 1996). Lee *et al.* (1996) pointed out that *A. nubes* might be a variety of *A. garmani*. In the present paper we report two new species of *Asca*, one of them associated with plant leaf and another one from soil.

#### Key to species of *Asca* from Korea

- 1. Posterolateral tubercle (horn) with only a single well-developed pinnate seta ..... 2
  - Posterolateral tubercle with 2 well-developed pinnate or simple setae ..... 4
- 2. Dorsal shield ornamented with a polygonal network of small protuberances ..... *A. aphidioides*

- Dorsal shield without a polygonal network of small protuberances ..... 3
- 3. Dorsal setae S4 and Z5 smooth ..... *A. garmani*
- Dorsal setae S4 and Z5 with minute barbs ..... *A. nubes*
- 4. Setae on posterolateral tubercle simple ..... *A. sculptrata*
- Setae on posterolateral tubercle strongly pinnated ..... 5
- 5. Dorsal setae simple except a few setae on dorsal shield. Z3, J4 and J4 shorter than their distances ..... *A. odowdi* n. sp.
- Dorsal setae with barbs. Z3 reaches base of J4, J4 reaches base of J5 .....  
..... *A. kosungensis* n. sp.

## DESCRIPTION

Family Ascidae Voigts and Oudemans, 1905 떠돌이응애과

Genus *Asca* Heyden, 1826 빨응애속

### 1. *Asca kosungensis* n. sp. 고성빨응애 (신칭) (Fig. 1)

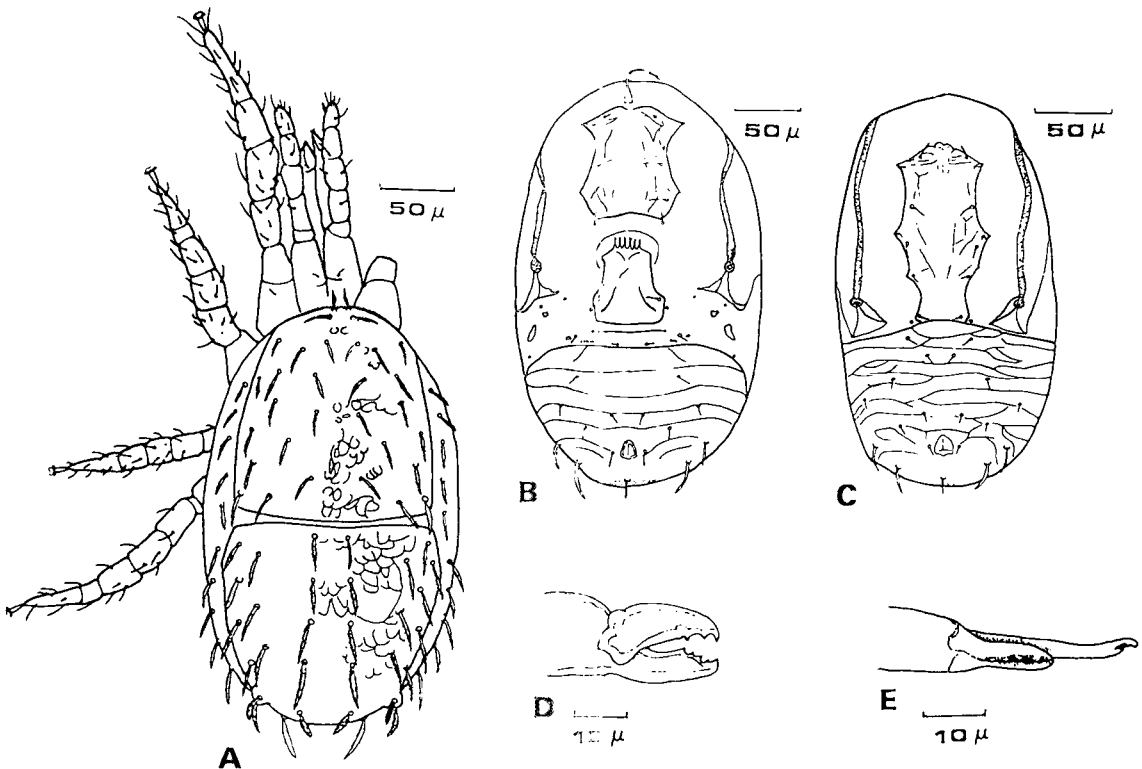
**Type series.** Holotype: ♀, Kosong Kyöngnam, 15 Sep. 1994 (H.Y. Seo leg.) Paratypes: 3 ♀ ♀, 3 ♂ ♂, same data with holotype. Types are deposited in the Department of Biology, Chönbuk National Univ., Korea.

**Additional material examined.** 24 ♀ ♀, 7 ♂ ♂, Kosöng Kyöngnam, 15 Sep. 1994 ; 2 ♀ ♀, 1 ♂, Ch'ongju Ch'ungbuk, 7 Aug. 1994 ; 1 ♀, 1 ♂, Wibong falls Soyang Chönbuk, 12 June 1994, 30 Oct. 1996 (W.K. Lee leg.); 1 ♀, 1 ♂, Maldo Is. Chönbuk, 19 Aug. 1994 (W.K. Lee leg.); 2 ♀ ♀, 2 ♂ ♂, Koch'ang Chönbuk, 15 June 1994 (W.K. Lee leg.); 1 ♀, 1 ♂, Mt. Kümjöng Yonggwang Chönnam, 8 Jan. 1994 (W.K. Lee leg.). The examined specimens are deposited in the Department of Biology, Chonbuk National Univ., Korea.

**Female:** Idiosoma 307.2 (289.4-325.0)  $\mu\text{m}$  long, 174.4 (168.3-180.9)  $\mu\text{m}$  wide at the level of R2. Anterior dorsal shield 148.8 (136.5-161.1)  $\mu\text{m}$  long, 141.6 (130.0-153.2)  $\mu\text{m}$  wide at the level of r6. Posterior dorsal shield 145.6 (136.3-154.9)  $\mu\text{m}$  long, 146.4 (138.2-154.6)  $\mu\text{m}$  wide at the level of S1. Dorsal shield with well-developed ornamentation: Elliptical on anterior dorsal shields, scale-like on posterior dorsal shields and butterfly-like on the region from J2 to Z1. Setae on dorsal shield and r-R series barbed. Anterior dorsal shield with 17 pairs of setae, posterior dorsal shield with 15 pairs of setae. J3 reaches the base of J4. Two pairs of setae on posterolateral tubercles as long as J5 and pinnate. Peritreme reaches base of J1, peritrematal shield well-developed. Tritosternum bifurcated and minutely barbed. Margin and below of sternal shield with longitudinal stripes. 4th sternal seta not located on sternal shield. Genital shield with 1 pair of setae. Interscutal membrane between genital shield and ventrianal shield with 2 pairs of setae and small platelets. Ventrianal shield with 7 pairs of setae and 1 postanal seta. Among them V8 minutely barbed. Movable digit of chelicera bidentate, fixed finger with 4 teeth. Measurements on the length of setae and distance between setae as follows (n=5, unit= $\mu\text{m}$ ): J1 22.4 (20.7-24.1), J2 25.6 (23.4-27.8), J3 28.8 (27.7-29.9), J4 33.2 (29.9-36.5), J5 22.0 (19.6-24.4), J1-J1 16.4 (14.7-18.1), J2-J2 21.2 (18.9-23.5), J3-J3 21.6 (18.6-24.6), J4-J4 31.6 (28.0-35.2), J5-J5 31.6 (29.0-34.2), Z3 32.4 (30.2-34.6),

Z4 20.0 (18.6-21.4), Z5 33.2 (30.5-35.9), J1-J2 30.4 (28.2-32.6), J2-J3 31.2 (30.1-32.3), J3-J4 28.8 (27.7-29.9), J4-J5 34.8 (32.5-37.1), J4-Z3 26.4 (23.1-29.7), Z2-S2 17.6 (15.9-19.3), Z2-S3 12.0 (10.6-13.4), Z2-S2/Z2-S3 1.5 (1.3-1.7), S5 21.6 (19.4-23.8), V1-V1 19.2 (18.1-20.3), V5-V5 70.0 (66.3-73.7), V6-V6 72.4 (67.8-77.0)

**Male:** Idiosoma 235.2 (230.0-240.4)  $\mu\text{m}$  long, 134.4 (130.8-138.0)  $\mu\text{m}$  wide at the level of R2. Anterior dorsal shield 118.4 (112.3-124.5)  $\mu\text{m}$  long, 111.6 (106.6-116.6)  $\mu\text{m}$  wide at r6. Posterior dorsal shield 103.2 (99.6-106.8)  $\mu\text{m}$  long, 110.0 (106.3-113.7)  $\mu\text{m}$  wide at S1. Ornamentation of dorsal shield similar to that of female. Sternogenital shield with 5 pairs of setae and 2 paired pores, one of which located posterior to the 1st sternogenital seta, another one anterior to the 3rd. Ventrianal shield large, with well-developed transverse stripes but no stripes behind the paraanal setae. Ventrianal shield with 9 pairs of setae and 1 postanal seta. Spermatodactyl on chelicera bifurcated, one branch longer than the other. Measurements of the length of setae and distances between setae as follows (n=5, unit= $\mu\text{m}$ ): J1 17.2 (16.1-18.3), J2 19.6 (17.9-21.3), J3 20.4 (19.5-21.3), J4 23.2 (21.4-25.0), J5 14.8 (13.7-15.9), J1-J1 9.6 (8.7-10.5), J2-J2 13.2 (12.1-14.3), J3-J3 11.2 (8.9-13.5), J4-J4 17.6 (15.0-20.2), J5-J5 20.0 (18.6-21.4), Z3 22.4 (21.5-23.3), Z4 14.0, Z5 24.8 (23.0-26.6), J1-J2 22.8 (21.7-23.9), J2-J3 22.0, J3-J4 20.0 (18.6-



**Fig. 1.** *Asca kosungensis* n. sp. : A, dorsum of female; B, venter of female; C, venter of male; D, chelicera of female; E, chelicera of male.

21.4), J4-J5 24.4 (23.5-25.3), J4-Z3 18.0 (16.0-20.0), Z2-S2 12.0, Z2-S3 10.0, Z2-S2/Z2-S3 1.2, S5 17.2 (16.1-18.3), V1-V1 14.4 (12.7-16.1), V5-V5 40.4 (37.8-43.0), V6-V6 57.2 (56.1-58.3)

**Etymology:** The specific name is derived from the type locality, Kosŏng, Kyŏngnam province.

**Remarks:** This new species, collected from soil litters, was most abundant at Kosŏng, Kyŏngnam province of Korea. The occurrence rate of female at this area was about 74 %, with its sex ratio being female 3 : male 1. The ornamentation and shape of the setae on the dorsal shields of the new species are very similar to those of *A. evansi* Genis, Loots and Ryke, 1969. But *A. kosungensis* differs from *A. evansi* by having J4 reaching to the base of J5 and the narrow, leaf-like J5. There is no ornamentation on medio-ventrianal shield in *A. evansi*. *A. grostali* Walter, Halliday and Lindquist, 1993 is distinguished from the new species by having J3 longer than J4. *A. malathina* Tseng, 1981 resembles *A. kosungensis* in having narrow, leaf-shaped setae, J5 and Z4. In *A. kosungensis* S5 is also narrow, leaf-shaped, in addition to these setae. The ornamentation in the region between J and J of *A. kosungensis* is irregularly elliptical or scale-like, whereas that of *A. malathina* is elongate. In addition to these, the length and distances between the setae, *A. kosungensis* differ from *A. malathina* (parenthesis, unit= $\mu\text{m}$ ) as follows: J5 22(20), J2-J2 21(15), J3-J3 22(16), J4-J4 32(34), Z3 32(27), Z5 33(30), J3-J4 29(25), J4-J5 35(29), J4-Z3 26(22).

**Distribution:** Korea (Ch'ongju, Wanju Soyang, Maldo Is., Koch'ang, Yonggwang, Kosŏng)

## 2. *Asca odowdi* n. sp. 잎벌응애 (신칭) (Fig. 2)

**Type series.** Holotype: ♀, Mt. Tosol Koch'ang Chŏnbuk, 3 Aug. 1992 (M. O. Ryu leg.), on *Styrax obassia*. Paratypes: 5 ♀♀, 4 ♂♂, same data with holotype. Types are deposited in the Department of Biology, Chonbuk National Univ., Korea.

**Additional material examined.** 18 ♀♀, 3 ♂♂, 6 nymphs, Mt. Chŏmbong Kangwon (2 ♀♀, 1 ♂, on *Salix hallaisanensis*, 7 Sep. 1992; 6 ♀♀, 2 ♂♂, on *Ulmus davidiana*, 7 Sep. 1992; 3 ♀♀, on *Viburnum sargentii*, 3 Sep. 1992; 2 ♀♀, on *Acer pseudosieboldianum*, 3 Sep. 1992; 1 ♀, on *Magnolia sieboldii*, 3 Sep. 1992; 1 ♀, on *Prunus padus*, 3 Sep. 1992; 1 ♀, on *Tripterygium regellii*, 3 Sep. 1992; 2 ♀♀, 4 nymphs, on *Rhododendron schlippenbachii*, 3 Sep. 1992; 2 ♀♀, 2 nymphs, on *Tilia amurensis*, 3 Sep. 1992, D. O' Dowd leg.): 17 ♀♀, 13 ♂♂, 3 nymphs, Mt. Tosol Koch'ang Chŏnbuk (10 ♀♀, 1 ♂, 1 nymph, on *Carpinus tschonoskii*, 19 Aug. 1988; 1 ♂, on *Fraxinus rhynchophylla*, 19 Aug. 1988; 1 ♀, 2 ♂♂, on *Meliosma myriantha*, 19 Aug. 1988; 3 ♀♀, 6 ♂♂, 2 nymphs, on *Carpinus tschonoskii*, 25 July 1990); 2 ♀♀, Mt. Naejang Chŏnbuk, on *Abies holophylla*, 1 Aug. 1990; 4 ♀♀ 9 ♂♂ 1 nymph, Guch'on-dong Muju Chŏnbuk, (2 ♀♀, 1 nymph, on *Styrax obassia*, 4 July 1990; 4 ♀♀, 9 ♂♂, on *Styrax obassia*, 30 July 1992; 2 ♂♂, on *Lindera obtusiloba*, 30 July 1992, M. O. Ryu leg.) The specimens are deposited in the Department of Biology, Chonbuk National Univ., Korea.

**Female:** Idiosoma 324.7 (316.2-333.2)  $\mu\text{m}$  long, 187.3 (181.4-193.2)  $\mu\text{m}$  wide at the level of R2. Anterior dorsal shield 153.3 (149.2-157.4)  $\mu\text{m}$  long, 161.3 (154.8-167.8)  $\mu\text{m}$  wide at r6. Posterior dorsal shield 162.0 (154.1-169.9)  $\mu\text{m}$  long, 161.3 (154.8-167.8)  $\mu\text{m}$  wide at S1. Body whitish. Anterior dorsal shield with 17 pairs of simple setae and developed polygonal or elliptical ornamentation showing scale-like pattern. Dorsal surface from J2 to Z1 with butterfly wing like lines.

Posterior dorsal shield with 17 pairs of setae, most of them simple, but those on posterior idiosoma more barbed in posterior ones. J3 and J4 with or without minute barbs, Z3 and S4 with distinct barbs. Posterolateral tubercles with 2 pairs of setae. Setae on tubercle as long as J5 and pinnate. Tritosternum bifurcated and sparsely barbed. Sternum with 3 pairs of setae and 4th sternal setae not placed on sternum. Genital shields with 1 pair of setae. Interscutal membrane between genital shield and ventrianal shield bears 2 pairs of setae and platelets. Of 2 pairs of postpodal platelets, anterior one small boat-shaped and posterior one elliptical. Ventrianal shield with 7 pairs of setae and with well-developed transverse stripes except around anus. One postanal seta. V7, V8, V9 sparsely barbed. Movable cheliceral digit bidentated. Fixed digit with 5 teeth. Epistome with minutely denticulated lateral margin. Measurements of setal length and distances between setae as follows (n=5, unit= $\mu\text{m}$ ): J1 13.0 (11.9-14.1), J2 14.3 (13.5-15.1), J3 15.7 (14.9-16.5), J4 17.7 (16.9-18.5), J5 17.7 (16.2-19.2), J1-J1 18.0 (16.2-19.8), J2-J2 22.7 (21.7-23.7), J3-J3 23.0 (21.9-24.1), J4-J4 30.0 (27.2-32.8), J5-J5 23.7 (22.2-25.2), Z3 21.0 (19.9-22.1), Z4 19.3 (18.3-20.3), Z5 23.3 (21.7-24.9), J1-J2 34.0 (30.9-37.1), J2-J3 33.0 (31.3-34.7), J3-J4 33.3 (31.2-35.4), J4-J5 48.0 (45.5-50.5), J4-Z3 28.0 (26.7-29.3), Z2-S2 21.7 (20.2-23.2), Z2-S3 17.0 (15.3-18.7), Z2-S2/Z2-S3 1.3 (1.2-1.4), S5 20.0 (18.7-21.3), V1-V1 21.0 (18.2-23.8), V5-V5 72.0 (69.8-74.2), V6-V6 55.3 (54.3-56.3)

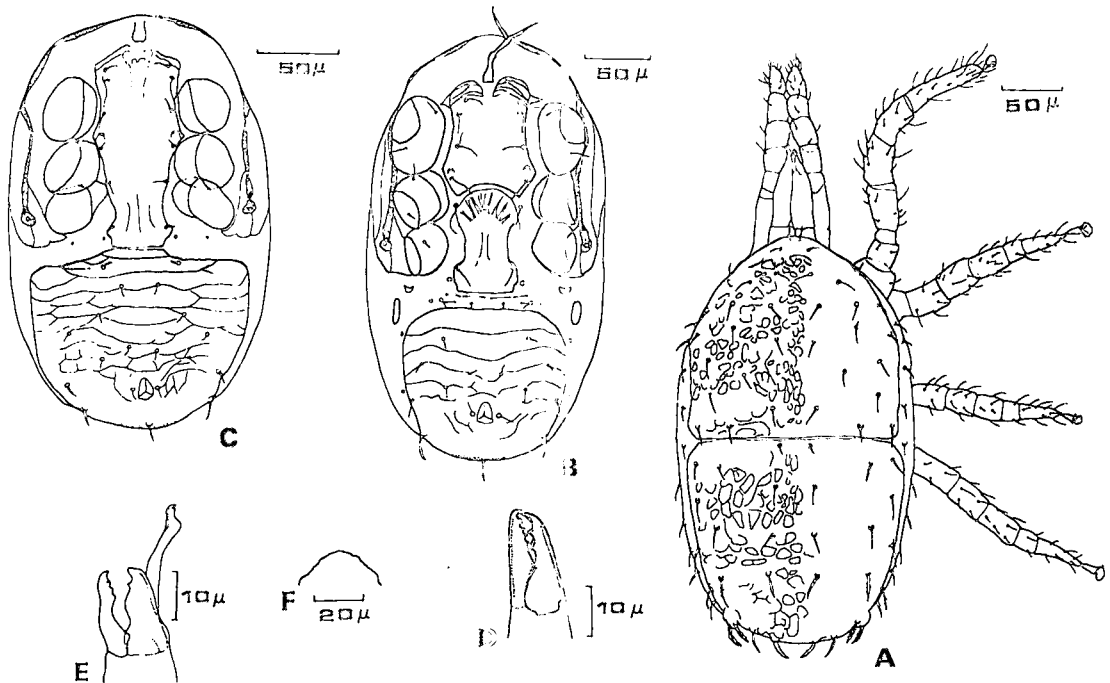


Fig. 2. *Asca odowdi* n. sp. : A, dorsum of female; B, venter of female; C, venter of male; D, chelicera of female; E, chelicera of male; F, tectum.

**Male:** Idiosoma 276.0 (254.5-297.5)  $\mu\text{m}$  long, 158.4 (145.0-171.8)  $\mu\text{m}$  wide at R2. Anterior dorsal shield 132.0 (120.3-143.7)  $\mu\text{m}$  long, 132.8 (123.7-141.9)  $\mu\text{m}$  wide at r6. Posterior dorsal shield 133.6 (120.5-146.7)  $\mu\text{m}$  long, 132.8 (123.7-141.9)  $\mu\text{m}$  wide at S1. Ornamentation of dorsal shield similar to that of female. Sternogenital shield with 5 pairs of setae and 2 pairs of sternogenital pores. One sternogenital pore located posterior to the 1st sternogenital seta and the other anterior to the 3rd. Ventrianal shield convex anteromedially and very closely to sternogenital shield. Ventrianal shield with 9 pairs of setae and one postanal seta. Spermatodactyl with bifurcated tip and waved as figured. Measurements of setae and distances between setae as follows (n=5, unit= $\mu\text{m}$ ): J1 12.4 (11.5-13.3), J2 12.4 (11.5-13.3), J3 14.0 (12.6-15.4), J4 14.8 (13.7-15.9), J5 12.8 (11.7-13.9), J1-J1 12.8 (11.7-13.9), J2-J2 16.8 (15.7-17.9), J3-J3 16.0 (14.0-18.0) J4-J4 23.2 (19.3-27.1), J5-J5 18.0 (15.6-20.4), Z3 18.4 (17.5-19.3), Z4 14.4 (13.5-15.3), Z5 18.8 (16.5-21.1), J1-J2 25.2 (22.9-27.5), J2-J3 25.6 (23.0-28.2), J3-J4 26.4 (23.8-29.0), J4-J5 38.4 (36.2-40.6), J4-Z3 22.0 (19.6-24.4), Z2-S2 18.8 (17.7-19.9), Z2-S3 12.4 (10.7-14.1), Z2-S2/Z2-S3 1.5 (1.3-1.7), S5 14.4 (13.5-15.3), V1-V1 18.8 (17.7-19.9), V5-V5 45.2 (42.9-47.5), V6-V6 50.0 (46.0-54.0)

**Etymology:** This species is named in honor of Dr. Dennis O' Dowd, Department of Ecology and Evolutionary Biology, Monash University, Australia. He offered valuable specimens collected during his stay in Korea, 1992.

**Remarks:** This new species was collected from leaves of 15 different plants (Table 1).

**Table 1.** The local distribution and host plant of *A. odowdi*.

Host plant	Kangwon-do		Ch'ollabuk-do		Total (%)
	Mt. Ch'ombong	Mt. Tosol	Mt. Naejang	Muju	
<i>Salix hallaisanensis</i>	3				3 (3.5)
<i>Ulmus davidiana</i>	8				8 (9.3)
<i>Viburnum sargentii</i>	3				3 (3.5)
<i>Acer pseudosieboldianum</i>	2				2 (2.3)
<i>Magnolia sieboldii</i>	1				1 (1.2)
<i>Prunus padus</i>	1				1 (1.2)
<i>Tripterygium regellii</i>	1				1 (1.2)
<i>Rhododendron schlippenbachii</i>	6				6 (7.0)
<i>Tilia amurensis</i>	4				4 (4.7)
<i>Carpinus tschonoskii</i>		23			23(26.6)
<i>Abies holophylla</i>			2		2 (2.3)
<i>Styrax obassia</i>		10		16	26(30.2)
<i>Meliosma myriantha</i>		3			3 (3.5)
<i>Fraxinus rhynchophylla</i>		1			1 (1.2)
<i>Lindera obtusiloba</i>				2	2 (2.3)
Total	29 (33.7)	37 (43.0)	2 (2.4)	18 (20.9)	86 (100)

Although *A. odowdi* is similar to *A. brevisetosa* Wood, 1965, several differences between the species are observable. In *A. odowdi* setae on the posterolateral tubercle are narrow, leaf-shape, whereas those of *A. brevisetosa* are simple. Moreover, the body and setae of *A. brevisetosa* are larger than those of the new species. Another closely related species, *A. foliata* Womersley, 1956 differs from the new species in having trifurcated epistome and serrulated setae on dorsal shields. Also *A. novazelandica* Wood, 1965 is similar to *A. odowdi*, but differs by having simple Z4, S5 and trifurcated epistome. *A. odowdi* is apparently a bisexual species. In a large collection of the new species (on *Carpinus tschonoskii*) at Mt. Tosol, the sex ratio was approximately 2 female : 1 male.

**Distribution:** Korea (Mt. Chŏmbong, Mt. Naejang, Mt. Tosol, Muju)

### Acknowledgements

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한국산 뿔응애속(떠돌이응애과: 중기문류)의 분류학적 연구 II.  
- 2 신종의 기재 -

이 원 구 · 이 소 영 · 류 면 욱  
(전북대학교 자연과학대학 생물과학부)

요 약

한국산 떠돌이응애류 2 신종, *Asca kosungensis* n. sp.와 *Asca odowdi* n. sp.를 기재하였다. 전자는 토양에서, 그리고 후자는 식물의 잎에서 채집되었다.