

NEW RECORD OF THE GENUS *LARRA* FABRICIUS, 1793
(HYMENOPTERA, CRABRONIDAE) FROM VIETNAM

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ABSTRACT

The genus *Larra* Fabricius, 1793 (Hymenoptera: Crabronidae) is recorded for the first time from Vietnam. Three species and two subspecies belonging to this genus as follows: *L. amplipennis* (F. Smith, 1873); *L. carbonaria* (F. Smith, 1858); *L. fenchihuensis* Tsuneki, 1967; *L. polita polita* (F. Smith, 1858) and *L. polita luzonensis* Rohwer, 1919 are presented. Keys to both sexes of the three species and two subspecies reported here are provided.

Keywords: Crabronidae, *Larra*, Oriental region, Species group, Vietnam.

INTRODUCTION

Larra Fabricius, 1793 is a genus of the family Crabronidae that has a worldwide distribution. The genus consists of 64 species and 13 subspecies (Pulawski, 2021). Of these, 25 species and 6 subspecies are recorded for the Oriental region. This genus has become important in recent years because wasps of the genus are exclusive predators of mole crickets (Orthoptera: Gryllotalpidae) (Menke, 1992), which are serious pests of several important crops, for example, warm season turfgrass and pastures in the southern United States (Abraham *et al.*, 2008).

Females of this genus do not construct their own nest and prey paralysis is temporary, the host reviving soon after egg deposition. Reminiscent of parasitoids, the egg of *Larra* is small, and females have a high egg output, each female probably laying more than 30 eggs during her lifespan (Bohart and Menke, 1976).

In the present study, the genus *Larra* is recorded from Vietnam for the first time and keys to both sexes of Vietnamese species are also provided.

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MATERIALS AND METHODS

The sampling was taken using both sweeping nets and Malaise traps; the adult morphological characters were observed from pinned and dried specimens with the aid of a stereoscopic microscope. Information on the taxonomic history and full synonyms of all species was taken from Pulawski (2021). The original descriptions of species or subspecies were used for identification of Vietnamese species of the genus *Larra*. Photographic images were taken using a Nikon SMZ800N microscope camera and a Canon camera SD3500 IS. Provincial distributions were only for records from Vietnam.

The specimens examined in the present study are deposited in the Institute of Ecology and Biological Resources (IEBR), Vietnam Academy of Science and Technology (VAST), Ha Noi, Vietnam.

The following abbreviations are used for the museums in the text.

BMNH: The Natural History Museum, United Kingdom, London

OXUM: Hope Department of Entomology, Oxford, Great Britain.

USNM: National Museum of Natural History, Washington, D.C., U.S.A.

RESULTS AND DISCUSSION

The genus *Larra* with three species and two subspecies, *L. amplipennis* (F. Smith, 1873); *L. carbonaria* (F. Smith, 1858); *L. fenchihuensis* Tsuneki, 1967; *L. polita polita* (F. Smith, 1858) and *L. polita luzonensis* Rohwer, 1919 are newly recorded for Vietnam.

Key to the species and subspecies of *Larra* Fabricius, 1793 from Vietnam

Females:

1. Interocular distance on vertex longer than flagellomeres 1+2; inner orbit margins divergent posteriorly in vertical view; scape and pedicel obscure, with moderately dense setae (Pl. 1A); outer surface of fore tibia with row of stout, long spines; forewing dark brown (Pl. 1D); metasomal tergites 1 and 2 and basal half of tergite 3 red (Pl. 1C) *L. amplipennis*
 - Interocular distance on vertex shorter than flagellomeres 1+2; inner orbit margins on vertex convergent posteriorly; scape and pedicel polished, with rather sparse setae; outer surface of foretibia without row of stout, long spines; forewing varied; metasoma black 2
2. Legs wholly black 3
 - At least hind femur red 4
3. Mandible red (Pl. 2A); propodeal plate transversely sinuate, with short medial longitudinal carina (Pl. 2B); metasomal tergite polished, sparsely punctured; pygidial plate sparsely punctured (Pl. 2C) *L. carbonaria*
 - Mandible black (Pl. 3A); propodeal plate transversely round, without medial carina (Pl. 3B); metasomal tergite rather densely punctured; pygidial plate closely punctured (Pl. 3C) *L. fenchihuensis*
4. Mid and hind femora and tibiae red (Pl. 4D), mandible partly red (Pl. 4A) *L. polita polita*

- Hind femur red, mid and hind tibia black (Pl.5A), mandible mostly red *L. polita luzonensis*

Males (male of *L. carbonaria* (F. Smith, 1858) unknown)

1. Interocular distance on vertex longer than flagellomeres 1+2; scape and pedicel obscure, with moderately dense setae; vertex with dense white setae (Pl. 1E); forewing dark brown; metasomal tergites 1-3 red (Pl. 1F) *L. amplipennis*
 - Interocular distance on vertex shorter than flagellomeres 1+2, scape and pedicel polished, with rather sparse setae; vertex with sparse white setae; forewing varied; metasoma wholly black..... 2
2. Legs wholly black (Pl. 3F); propodeal plate transversely rounded, without medial carina; sides not obliquely striate near anterior apex *L. fenchiensis*
 - At least hind femur red; propodeal plate transversely sinuate, with long medial carina, sides moderately oblique striate near anterior apex 3
3. Mid and hind femora and tibiae red (Pl. 4E) *L. polita polita*
 - Hind femur red, mid and hind tibiae black (Pl. 5B) *L. polita luzonensis*

(1) *Larra amplipennis* (F. Smith, 1873) (Pl. 1)

Larrada amplipennis F. Smith, 1873: 193, ♂. Holotype or syntypes: ♂, Japan: Hyogo (BMNH).

Material examined: Vietnam: Ha Noi: 2 ♀♀, Co Nhue, Tu Liem, 22.ix-07.xi.2001, Malaise trap, P.T. Nhi; 6 ♂♂, Da Ton, Gia Lam, 5-15.xi.2001, Malaise trap (set up in apple, guava, and mandarin gardens), M.P. Quy; 3 ♂♂, Da Ton, Gia Lam, 25.viii-5.ix.2001, Malaise trap, K.D. Long. Ha Giang: 4 ♂♂, Tham Ve, Cao Bo, Vi Xuyen, 5-15.x.2001, 25.x-5.xi.2001, 800 m, rice, K.D. Long.

Diagnosis: Female (Pl. 1A-D), body length 14-15 mm; interocular distance on vertex longer than flagellomeres 1+2; scape and pedicel obscure, with moderately dense setae; inner orbit margins on vertex divergent posteriorly; outer surface of fore tibia with 6-7 stout, long spines; outer surface of mandible polished; pronotum, mesoscutum, mesopleuron, scutellum, metanotum with dense punctures; metasoma smooth, polished, with sparse punctures; pygidial plate narrow, with rather sparse punctures; body black, except mandible dark red, wing and veins dark brown, metasomal tergites 1, 2 and basal half of metasomal tergite 3 red.

Male (Pl. 1E-F): Body length 10-13 mm; similar to female except the following characters: vertex with dense white setae; face covered with densely silvery setae; forewing dark brown; pygidial plate without around carina; apex of metasomal sternite 8 roundly incised; apical bands of metasomal tergites with moderately densely silvery setae; metasomal tergites 1-3 and ¼ base of tergite 4 red.

Distribution: Japan, Korea, Taiwan, China and Vietnam (Ha Noi, Ha Giang (Map 1)).

The specimens of the male from Vietnam agree with those from Japan which were

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originally described by F. Smith (1873) as the nominate species, but differ from them by having the following two variational features: red metasomal tergites 1-3 (in contrast, only red metasomal tergites 1-2), brightly yellowish tegulae (in contrast, obscurely testaceous tegulae). In addition, the male specimens from Vietnam also agree with those from Thailand which were described by Tsuneki (1963) as a subspecies, *L. amplipennis aenipilosa*, but differ from them by having the body covered with silvery-white setae (in contrast, the body filled with brassy setae).

(2) *Larra carbonaria* (F. Smith, 1858) (Pl. 2)

Larrada carbonaria F. Smith, 1858: 102, ♀. Holotype or syntypes: ♀, Singapore (OXUM).
Material examined: Vietnam: Hoa Binh: 1 ♀, Hang Kia, Mai Chau, 22.x.2018, insect net, Ph.H. Pham.

Diagnosis: Female (Pl. 2A-D), body length 12-13 mm; interocular distance on vertex shorter than flagellomeres 1+2; scape and pedicel smooth and polished, with rather sparse setae; inner orbit margins on vertex divergent posteriorly; outer surface of fore tibia without stout, long spines; propodeal plate transversely sinuate, with median longitudinal carina, posterior surface of propodeum punctured, with strong, coarse transverse striae; pygidial plate sparsely punctured, edged with strong carina; body black, except mandible red, fore tibia and fore tarsus black and red; wing brownish.

Male: Unknown.

Distribution: Singapore, Myanmar, Malaysia, Indonesia, Philippines, Taiwan, Japan, India, China, Russia and Vietnam (Hoa Binh (Map 1)).

(3) *Larra fenchihuensis* Tsuneki, 1967 (Pl. 3)

Larra fenchihuensis Tsuneki, 1967: 22, ♀, ♂. Holotype: sex not indicated, Taiwan: Chiayi Prefecture: Fenchihu (originally K. Tsuneki coll., now USNM).
Material examined: Vietnam: Son La: 1 ♀ + 1 ♂, Copia Nature Reserve, Thuan Chau, 14.v.2017, Ph.H. Pham.

Diagnosis: Female (Pl. 3A-D), body length 11-13 mm; interocular distance on vertex shorter than flagellomeres 1+2; scape and pedicel smooth, polished, with rather sparse setae; outer surface of fore tibia without stout, long spines; propodeal plate transversely rounded, without median carina, posterior surface of propodeum punctured, with fine, close transverse striae; pygidial plate densely punctured, edged with weak carina; body black, except mandible dark red at apical half, fore tibia and fore tarsus red and black, wings brownish.

Male (Pl. 3E-F): Body length 10-11 mm; propodeal sides sparse, small punctured, metasomal tergites with white seta bands laterally; pygidial plate flat, edged with weak carina, not truncated at apex; body black; mandible red in part.

Distribution: China, Taiwan, and Vietnam (Son La (Map 1)).

(4-a) *Larra polita polita* (F. Smith, 1858) (Pl. 4)

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Larrada polita F. Smith, 1858: 102, ♀. Holotype or syntypes: ♀, Malaysia: Sarawak: no specific locality (OXUM).

Material examined: Vietnam: Ha Noi: 1 ♂, Co Nhue, Tu Liem, 07.xi-07.xii.2001, Malaise trap, P.T. Nhi; 1 ♀ + 1 ♂, Da Ton, Gia Lam, 5-15.xi.2001, Malaise trap (set up in apple and guava gardens), K.D. Long; 11 ♀♀ + 2 ♂♂, Red River bank, 21.vi.2012, 1-10.vii.2012, 1-10.viii.2012, Malaise trap, K.D. Long, D.T. Hoa. Nghe An: 2 ♂♂, Cua Lo town, 29.vi.2017, Ph.H. Pham.

Diagnosis: Female (Pl. 4A-D), body length 11-13 mm; interocular distance on vertex shorter than flagellomeres 1+2; scape and pedicel smooth, polished; outer surface of fore tibia without long spines; propodeal plate transversely rugose, with median carina, posterior surface of propodeum punctured, with medial groove; pygidial plate with sparse punctures; body black, except the following: mandible, apex of fore femur, fore tibia, fore tarsus, mid and hind femora and tibia red; wing brownish.

Male (Pl. 4E-F): Body length 8-9 mm; interocular distance on vertex as long as flagellomeres 1+2; mandible red except apical part; sides of propodeum markedly rugose; pygidial plate without around carina, subcircular at apex; fore tibia, mid and hind femora and tibiae red, fore femur and fore tarsus black and red.

Distribution: Malaysia, Taiwan, Philippines, Vietnam: Ha Noi, Nghe An (Map 1).

(4-b) *Larra polita luzonensis* Rohwer, 1919 (Pl. 5)

Larra luzonensis Rohwer, 1919: 10, ♀. Holotype: ♀, Philippines: Luzon: Los Baños (USNM).

Material examined: Vietnam: Ha Giang: 5 ♂♂, Cao Bo, Vi Xuyen, 5-15.x.2001, Malaise trap, rice, K.D. Long. Vinh Phuc: 2 ♂♂, Me Linh Station for Biodiversity, Ngoc Thach, Me Linh, 6.x.2008, 1.vi.2018, insect net, Ph.H. Pham. Hoa Binh: 2 ♂♂, Luong Son, vi.2018, Malaise trap, D.T. Hoa; 1 ♀, Kim Boi, 5-15.ix.2012, Malaise trap, K.D. Long. Ha Noi: 1 ♀, Ba Vi National Park, Ba Vi, 28.v.2016, Ph.H. Pham. Son La: 2 ♂♂, Son La city, 1.vi.2017, 16-25.v.2018, Malaise trap, K.D. Long. Tuyen Quang: 1 ♀, Trung Phin, Na Hang, 18.vii.2017, HTHCT; 4 ♂♂, Na Hang, 30.v-10.vi.2017, 20-30.vii.2017, Malaise trap, K.D. Long; 1 ♂, Nam Luong, Phu Luu, Ham Yen, 28.x.2018, 74 m.

Diagnosis: Female (Pl. 5A), body length 12-16 mm; similar to structure of *L. polita polita* except fore tibia, middle femur, middle tibia and hind tibia black; fore femur and fore tarsus red and black.

Male (Pl. 5B): Body length 6-12 mm; pygidial plate bordered by carina, with apex feebly emarginated; fore tibia, middle femur, mid tibia and hind tibia black.

Distribution: Philippines, Hawaii, Japan, Taiwan, China and Vietnam (Ha Noi, Ha Giang,

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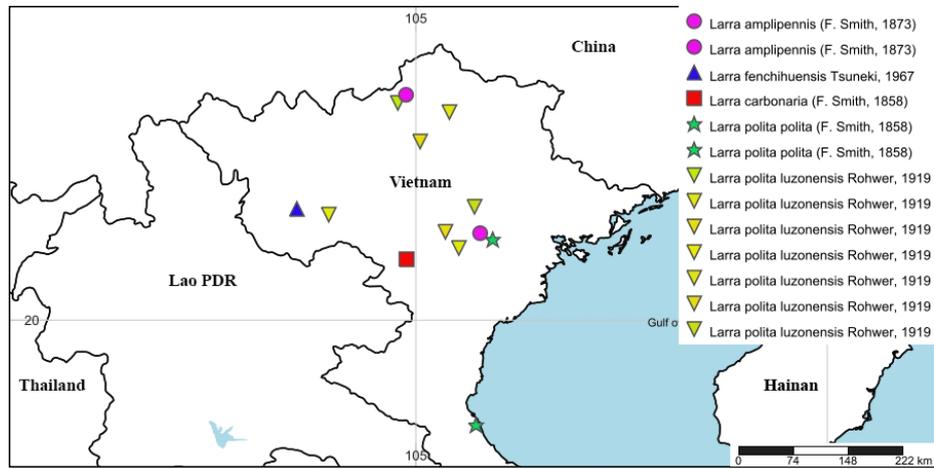
Tuyen Quang, Hoa Binh, Son La, Vinh Phuc (Map 1)).

Of five male specimens of *L. polita luzonensis* collected by Malaise traps between 5-15 October 2001 at Cao Bo, Vi Xuyen, Ha Giang, one agreed with the nominate species in having fore tibiae, mid and hind femur and tibiae red; two agreed with the subspecies by having only hind femora red; and the others differed from the nominate species and the subspecies by having fore and mid tibiae, and hind femora dark red. In two male specimens collected by Malaise traps in June 2018 at Luong Son, Hoa Binh, one agreed with the subspecies, the other differed from the subspecies by having hind femora black. Therefore, at one defined location of the sampling, there are several different colour forms suggesting that variation of colour on the body occurs in populations of the species and the subspecies.

The Vietnamese species of the genus *Larra* are divided into two groups, the *amplipennis* species group and the *carbonaria* species group. The former consists of only one species, *L. amplipennis*, and is characterized by having the interocular distance on the vertex longer than flagellomeres 1+2; inner orbit margins on the vertex posteriorly diverged; the scape and pedicel distinctly obscure, with moderately dense setae; the outer margin of the fore tibia with two rows of stout, long spines; dark brown wings; the first and second metasomal tergites red. The latter consists of two species and two subspecies *L. carbonaria*, *L. fenchihuensis*, and *L. polita polita* and *L. polita luzonensis*, and is characterized by having the interocular distance on the vertex shorter than or as long as flagellomeres 1+2; inner orbit margins on the vertex posteriorly converged; the scape and pedicel smooth and polished, with rather sparse setae; the outer surface of the fore tibia without rows of long, stout spines; brownish wings; the wholly metasoma black.

A common character between the two Vietnamese species groups is for all males, to have the placoid on flagellomeres 2-11. Menke (1992) considered the placoid on male flagellomeres as a character different from species groups of the new world *Larra*. He divided the new world *Larra* into three groups (*bicolor*, *burmeisterii*, and *analis* species groups), among them, the first and second groups having the placoid on flagellomeres 3-11. The placoid on flagellomeres 2-11 in the two Vietnamese species groups are possibly a feature characteristic of the Old World species groups of the genus *Larra*.

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Map (1): Map showing distribution of the Vietnamese *Larra* species and subspecies.

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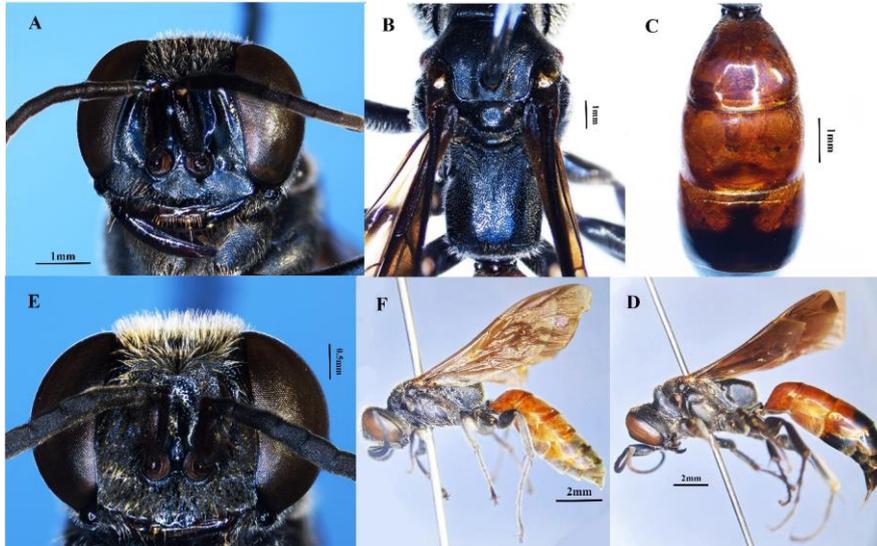


Plate (1): *L. amplipennis*; (A) ♀ head, frontal view, (B) ♀ mesosoma, dorsal view, (C) ♀ metasoma, first three metasomal tergites, (D) ♀ habitus, (E) ♂ head, frontal view, (F) ♂ habitus.



Plate (2): Female of *L. carbonaria*; (A) Head, frontal view, (B) Mesosoma, dorsal view, (C) Metasoma, dorsal view, (D) Habitus, lateral view.

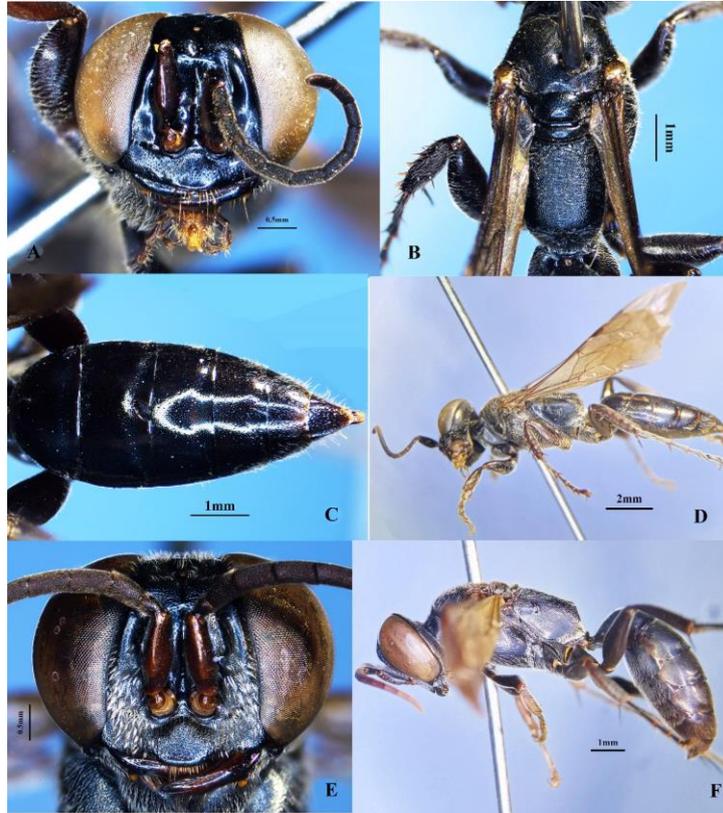


Plate (3): *L. fenchiuensis*; (A) ♀ head, frontal view, (B) ♀ mesosoma, dorsal view, (C) ♀ metasoma, dorsal view, (D) ♀ habitus, (E) ♂ head, frontal view, (F) ♂ habitus.

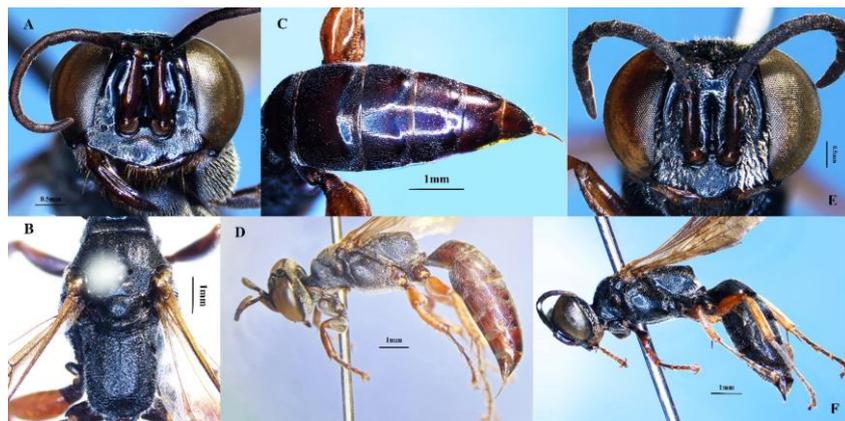


Plate (4): *L. polita polita*; (A) ♀ head, frontal view, (B) ♀ mesosoma, dorsal view, (C) ♀ metasoma, dorsal view, (D) ♀ habitus, (E) ♂ head, frontal view; (F) ♂ habitus.

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Plate (5): Habitus of *L. polita luzonensis*; (A) Female, (B) Male.

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CONFLICT OF INTEREST STATMENT

"The authors have no conflicts of interest to declare".

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تسجيل جديد لجنس *Larra* Fabricius, 1793
(Hymenoptera, Crabronidae) في فيتنام

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الخلاصة

سجل جنس *Larra* Fabricius, 1793 (Hymenoptera, Crabronidae) لأول مرة في

فيتنام؛ حيث شُخص ثلاثة أنواع ونوعين ينتمون إلى هذا الجنس على النحو التالي:

L. amplipennis (F. Smith, 1873)

L. carbonaria (F. Smith, 1858)

L. fenchihuensis Tsuneki, 1967

L. polita polita (F. Smith, 1858)

L. polita luzonensis Rohwer, 1919

صممت مفاتيح تشخيصية لكلا للذكور و الاناث للأنواع و النويغات المسجلة.