

# *Dichodactylus* gen. nov. (Araneae: Agelenidae: Coelotinae) from Japan

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*Dichodactylus* gen. nov. (type species *Coelotes tarumii* Arita, 1976) is described from western Japan. Three species are recognized: *Dichodactylus shinshuensis* sp. nov., *D. tarumii* (Arita, 1976) comb. nov. (transferred from *Coelotes* Blackwall, 1841), and *D. satoi* (Nishikawa, 2003) comb. nov. (transferred from *Orumceki* Koçak and Kemal, 2008). *Dichodactylus* is compared with *Orumceki*, especially morphological similarities in the male palps. Diagnostic and descriptive characteristics of the three species are presented including a species distribution map and genitalic illustrations.

**Key Words:** Taxonomy, Coelotinae, new genus, new species, new combination, Japan.

## Introduction

Coelotine spiders (Agelenidae) are diverse in Japan: 116 species in ten genera have been described, with most (87 species) classified in *Coelotes* Blackwall, 1841 (World Spider Catalog 2017). However, *Coelotes* appears to be polyphyletic (Chen *et al.* 2016) and many Japanese species of *Coelotes* have never been examined critically (Wang 2002), especially in relation to the type species of the genus, *Coelotes atropos* (Walckenaer, 1830). Wang (2002) and Wang and Martens (2009) suggested that among Japanese coelotine spiders, only members of the *C. exitialis* L. Koch, 1878 species group are “true” *Coelotes*. Male palpal patellar apophysis number is one of a number of important characteristics in coelotine taxonomy (Wang 2002, 2003). Currently, only *Orumceki* Koçak and Kemal, 2008, and some species of each of *Platocoelotes* Wang, 2002 and *Tegeocoelotes* Ovtchinnikov, 1999 have been known to have two palpal patellar apophyses; males of “true” *Coelotes* have only one (Wang 2002). After careful examination of the genital organs of Japanese coelotine spiders for which both sexes have been identified, males of *Coelotes tarumii* Arita, 1976 were found to have two palpal patellar apophyses, suggesting that *C. tarumii* is not a “true” *Coelotes*. Furthermore, *Orumceki satoi* (Nishikawa, 2003) appeared to be more closely related to *C. tarumii* than they are to the type species of the genus, *Orumceki gemata* (Wang, 1994). Finally, an undescribed species identified by Yasunosuke Chikuni (Chikuni 1989) and known to be distributed throughout the Chubu District of Japan closely resembles *C. tarumii* and *O. satoi*. Genitalic characters of these three species also are significantly different from those used to define *Platocoelotes* (see new genus discussion below).

Here, because these three species apparently are closely related to each other and do not fit easily within *Orumceki*

or *Platocoelotes*, I provide argumentation for, and describe and illustrate a new genus for these three species herein, with a new species description and redescription of the two known species.

## Materials and Methods

Specimens were examined and illustrated using an Olympus SZX-7 stereomicroscope. Epigynum (after treatment in 10% KOH solution to remove non-sclerotized tissues) and left male palp was removed for examination and illustration as necessary. Photographs were taken using an Olympus E-620 digital camera attached to the stereomicroscope. Measurements of respective body parts were done using a micrometer reticule mounted in an ocular lens. All measurements are given in millimeters. Leg measurements are given as total length (femur, patella and tibia, metatarsus, and tarsus). Abbreviations used in this paper are as follows: ALE, anterior lateral eye; AME, anterior median eye; LTA, lateral tibial apophysis; MOA, median ocular area; PLE, posterior lateral eye; PME, posterior median eye; RTA, retrolateral tibial apophysis.

Type specimens of the new species described in this paper are deposited in the collection of the Department of Zoology, National Museum of Nature and Science, Tsukuba (NSMT), Japan.

Family **Agelenidae** C. L. Koch, 1837  
Subfamily **Coelotinae** F.O.P.-Cambridge, 1893  
Genus ***Dichodactylus*** gen. nov.

**Type species.** *Coelotes tarumii* Arita, 1976

**Diagnosis.** Males of *Dichodactylus* can be clearly distinguished from males of all other coelotine genera except

*Orumcekia*, some species of *Platocoelotes* and some species of *Tegeocoelotes* by having two patellar apophyses and reduced LTA in male palp (Figs 1B, 5A–C). Females can be distinguished from all other coelotine genera except for some species of *Coelotes*, *Draconarius* Ovtchinnikov, 1999 and *Pireneitega* Kishida, 1955 by having anteroposteriorly elongated and convoluted spermathecae in an internal genitalia (Figs 1D, 2D, 3D, 4D). Males can be distinguished from males of *Orumcekia* by the absence of a ventral apophysis of the conductor and the semi-circular or crescent-shaped median apophysis (Fig. 1A, B) (*vs.* present, and spatulate

or hook-shaped, respectively, in *Orumcekia*: Fig. 1E, F; in an apparent simple labeling error in Wang (2002), median apophysis was marked as an embolus in figs 161, 162, however, it was correctly labeled elsewhere in the same paper, *e.g.*, figs 166, 167); females are distinguished by the absence of a posterolaterally expanded margin in the epigynum (Fig. 1C) (*vs.* present in *Orumcekia*: Fig. 1G). Moreover, females of *Dichodactylus* have anteroposteriorly elongated and convoluted spermathecae (Fig. 1D), while the spermathecae of *Orumcekia* are more compact and transversely oriented in the posterior portion of the vulva (Fig. 1H). Species of *Di-*

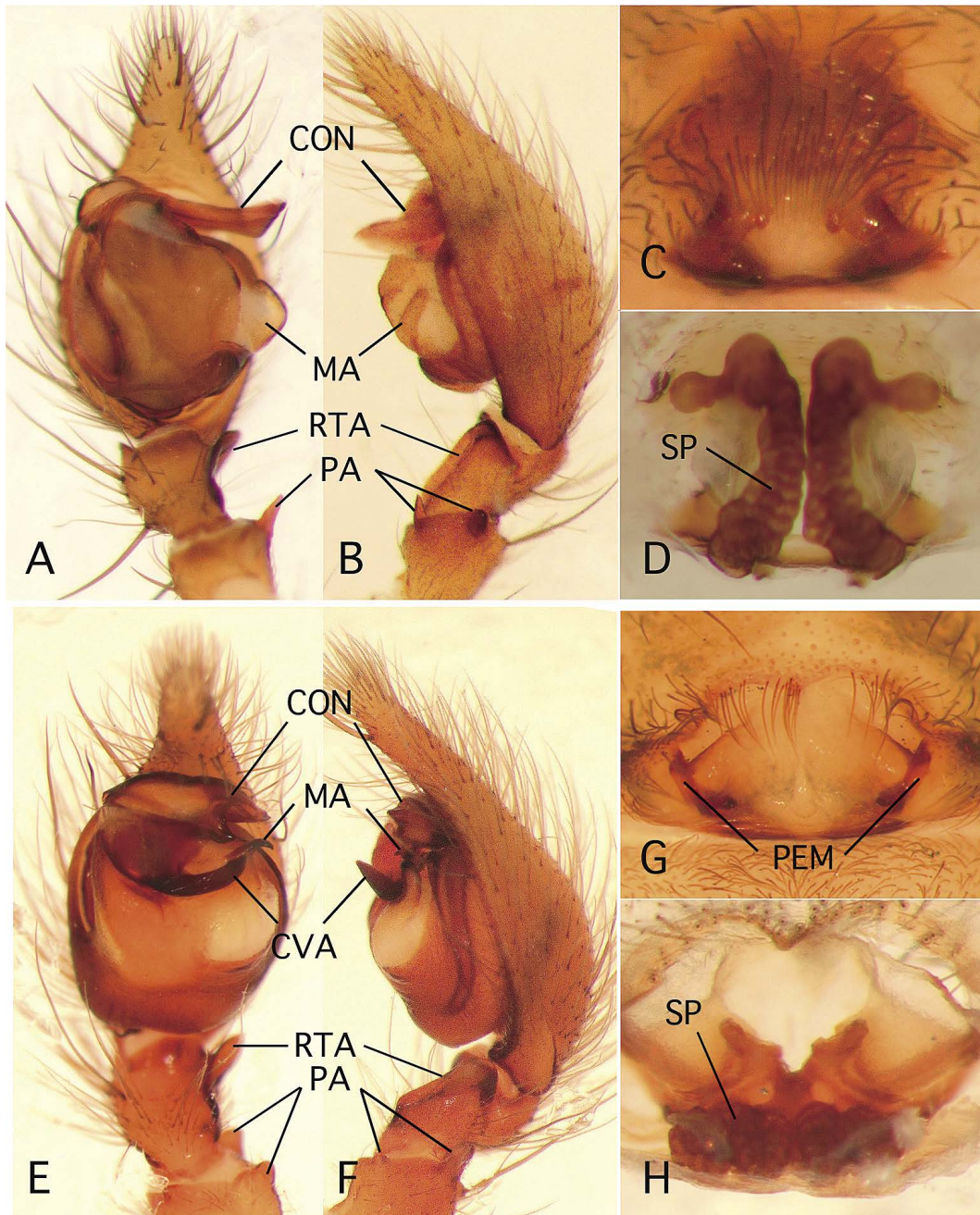


Fig. 1. Comparison between the genera *Dichodactylus* gen. nov. and *Orumcekia* Koçak and Kemal, 2008: A–D, *D. tarumii* (Arita, 1974), male (A, B: NSMT-Ar 14732), and female (C, D: NSMT-Ar 14733); E–H, *O. gemata* (Wang, 1994), male (E, F: NSMT-Ar 14737), and female (G, H: NSMT-Ar 14736). A, E, ventral views of male palp; B, F, retrolateral views of male palp; C, G, ventral views of epigynum; D, H, dorsal views of internal female genitalia. Abbreviations: CON, conductor; CVA, conductor ventral apophysis; MA, median apophysis; PA, patellar apophyses; PEM, posterolaterally expanded margin; RTA, retrolateral tibial apophysis; SP, spermatheca.

*chodactylus* can be distinguished from *Platocoelotes* by a spatulate conductor, short cymbial furrow, short embolus, and no epigynal hood (Fig. 1A–C) (*vs.* a conductor elongated to the base of cymbium obliquely, elongated cymbial furrow, long filiform embolus, and the presence of epigynal hood in *Platocoelotes*: Wang 2002, 2003). Specimens of *Dichodactylus* also can be distinguished from *Tegecoelotes* by a semi-circular or crescent-shaped median apophysis (Fig. 1A, B), no or nipple-shaped epigynal teeth (Fig. 5D–F) and anteroposteriorly elongated and convoluted spermathecae (Fig. 1D) (*vs.* hook-shaped median apophysis, broad epigynal teeth and posteriorly situated spermathecae in *Tegecoelotes*: Wang 2002, 2003).

**Description.** Small- to medium-sized coelotine spiders, 5.0–10.0 mm in length. Cheliceral promargin with three teeth, retromargin with four. Leg formula IV-I-II-III. Carapace brown or yellowish brown with grayish brown radial flecks; dorsum of abdomen grayish brown with yellowish brown chevrons or irregular spots, and venter yellowish brown with grayish brown irregular flecks; sternum yellowish brown and its marginal region brown; chelicerae and maxillae reddish brown; labium brown; legs yellowish brown with grayish brown ring flecks in femur, patella and tibia.

**Male.** Palp (Figs 1A, B, 4A–C): two patellar apophyses present; LTA reduced; RTA large and elongated; cymbial furrow short, one-sixth or one-seventh of the cymbial length; median apophysis crescent-shaped or semicircular; conductor spatulate, resembles that of *Tegecoelotes*.

**Female.** Epigynum and internal genitalia (Figs 1C, D, 4D–F): epigynum hexagonal or hourglass-shaped; epigynal teeth absent, or nipple-shaped and situated in posterior portion; epigynal hood absent; spermathecae elongated anteroposteriorly, convoluted and close to each other; spermathecal heads situated on anterolateral portion of spermathecae.

**Composition.** Three species:

1. *Dichodactylus tarumii* (Arita, 1976) comb. nov.
2. *Dichodactylus satoi* (Nishikawa, 2003) comb. nov.
3. *Dichodactylus shinshuensis* sp. nov.

**Distribution.** Japan (Chubu, Kinki and Chugoku Districts of Honshu, and Kyushu) (Fig. 6).

**Etymology.** The generic name is a compound noun derived from the Greek prefix *dicho-* "paired", and *dactylus-* "finger" referring to having two patellar apophyses in the male palp. The gender is masculine.

*Dichodactylus shinshuensis* sp. nov.  
(Figs 2A–D, 5A, D, 6)

*Coelotes* sp.: Chikuni 1989: 103, fig. 25.

**Type material.** All collected by Yoh Ihara. **Holotype:** male, Ōjimasan, 840 m alt., Takamori Town, Shimo-ina County, Nagano Pref. (35°57'2"N, 137°84'1"E), 21. X. 2010 (NSMT-Ar 13339). **Paratypes:** 1 male and 1 female, Tochibaradani, Ochiai, Osaka Town, Gero City, Gifu Pref. (35°95'7"N, 137°34'1"E), 14. X. 2009 (NSMT-Ar 13340, 13341).

**Diagnosis.** *Dichodactylus shinshuensis* sp. nov. can be distinguished from all the other *Dichodactylus* species by having the tip of the male palpal conductor twisted proximally at a right angle (Fig. 2A), the presence of a pair of lamellae laterally on the epigynum (Figs 2C, 5D) and the prominent copulatory ducts visible in ventral view of cleared vulva (Fig. 2D).

**Description of male (holotype).** Total length 5.6, carapace 2.9 long, 2.0 wide; abdomen 2.7 long, 1.6 wide; sternum 1.6 long, 1.3 wide. Eye sizes; AME 0.07, ALE 0.15, PME 0.12, PLE 0.14. Distances between eyes; AME-AME 0.07, AME-ALE 0.04, PME-PME 0.09, PME-PLE 0.12, AME-PME 0.10, ALE-PLE 0.04. MOA; anterior width 0.21, posterior width 0.33, length 0.29. Leg measurements: I: 7.9 (2.1, 2.7, 1.9, 1.2); II: 7.1 (2.1, 2.3, 1.7, 1.0); III: 6.6 (1.7, 2.1, 1.9, 0.9); IV: 9.4 (2.5, 3.0, 2.7, 1.2).

Palp (Figs 2A, B, 5A): two patellar apophyses present, situated at a right angle from each other in retrolateral view, LTA reduced, RTA large and broad; cymbial furrow short and indistinct about one-sixth of cymbial length; embolus flagelliform and short, conductor spatulate and tip twisted proximally at a right angle; median apophysis small, crescent-shaped; tegulum with swollen portion visible in retrolateral view.

**Description of female (paratype).** Total length 5.0, carapace 2.7 long, 1.5 wide; abdomen 2.3 long, 1.4 wide; sternum 3.2 long, 2.4 wide. Eye sizes; AME 0.06, ALE 0.14, PME 0.12, PLE 0.10. Distances between eyes; AME-AME 0.04, AME-ALE 0.03, PME-PME 0.07, PME-PLE 0.10, AME-PME 0.09, ALE-PLE 0.03. MOA; anterior width 0.16, posterior width 0.31, length 0.27. Leg measurements: I: 6.3 (1.9, 2.1, 1.4, 0.9); II: 5.6 (1.7, 1.8, 1.3, 0-8); III: 5.3 (1.5, 1.8, 1.3, 0.7); IV: 7.2 (2.0, 2.4, 1.9, 0.9).

Epigynum and internal genitalia (Figs 2C, D, 5D): epigynum hourglass-shaped, atrium large, almost rectangular and somewhat longer than wide, lamellae situated laterally to atrium, epigynal teeth absent, spermathecae elongated anteroposteriorly and well-separated on lateral edges of vulva, copulatory ducts prominent, large, irregularly convoluted and very visible in dorsal view of cleared vulva.

**Distribution.** Chubu District, central Japan (Nagano Pref., Gifu Pref.) (Fig. 6).

**Etymology.** Specific name is an adjective derived from the provincial name of Nagano Prefecture including the type locality.

*Dichodactylus tarumii* (Arita, 1976) comb. nov.  
(Figs 1A–D, 3A–D, 5B, E, 6)

*Coelotes tarumii* Arita, 1976: 201, figs 16–22; Yaginuma 1986: 151, fig. 81.2; Okumura *et al.* 2009: 184, figs 2-2-33-131–2-2-33-133.

**Type material.** Although Arita (1976) stated "the holotypes and part of the paratypes of the new species are preserved in the collection of the Arachnological Society of East Asia, Ohtemon-Gakuin University, Ibaraki, Osaka; the remainder of the paratypes are deposited in the collection

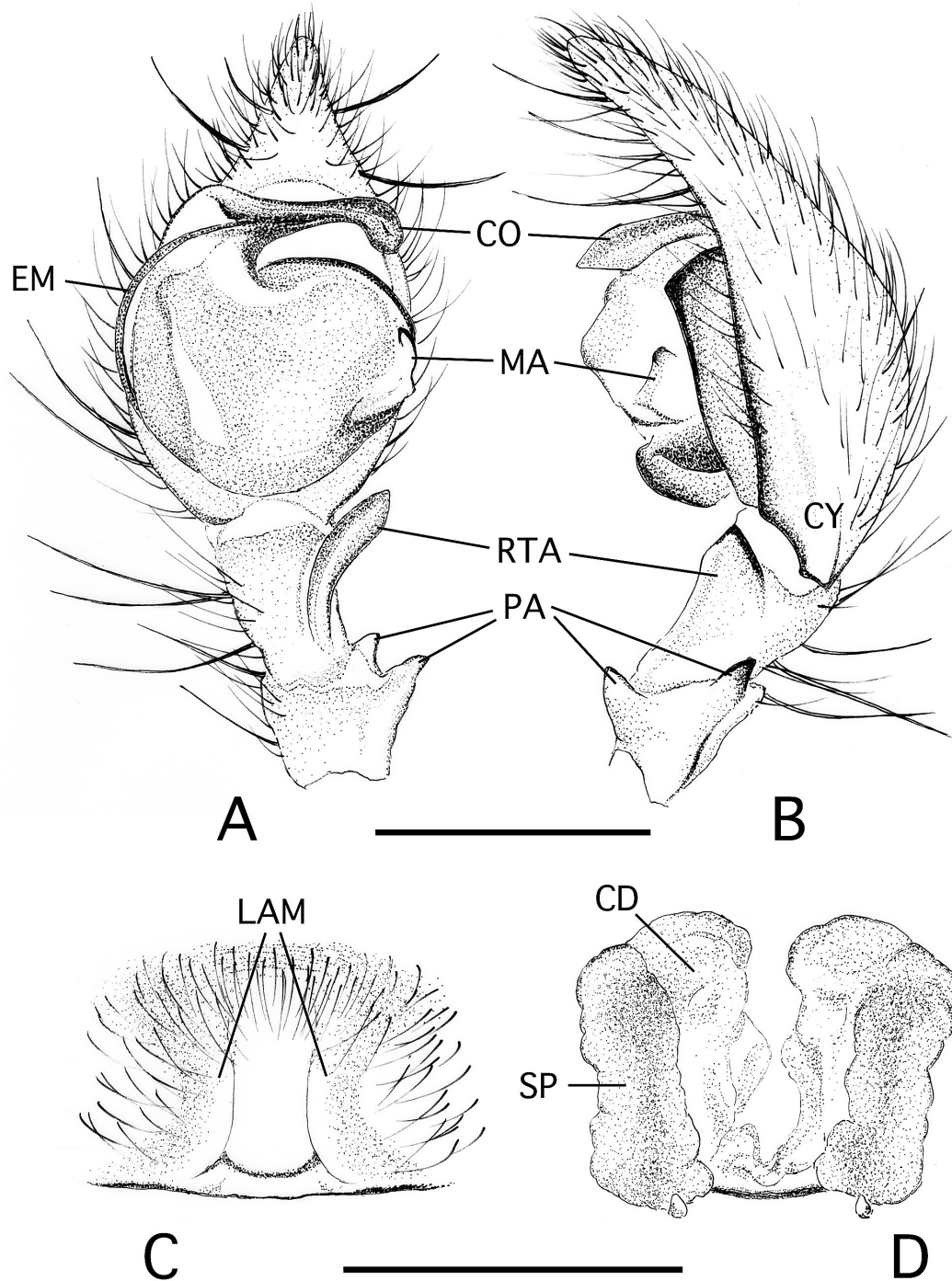


Fig. 2. *Dichodactylus shinshuensis* sp. nov., male (A, B: holotype, NSMT-Ar 13339), female (C, D: paratype, NSMT-Ar 13341). A, ventral view of male palp; B, retrolateral view of male palp; C, ventral view of epigynum; D, dorsal view of internal female genitalia. Abbreviations: CD, copulatory duct; CO, conductor; CY, cymbial furrow; EM, embolus; LAM, lamellas; MA, median apophysis; PA, patellar apophyses; RTA, retrolateral tibial apophysis; SP, spermatheca. Scale bars: 0.5 mm.

of the Tottori Prefectural Museum, Tottori”, none of the type material for this species could be located. Therefore I have not been able to examine the type specimens. However, this species is possible to identify in an original description, and I examined the specimens collected from Tottori Pref. which is near to the type locality. Further intensive survey should be done to make the presence or absence of type specimens clear in this species.

**Type locality.** Mt. Daisen, Tottori Prefecture, Japan

(Arita 1976).

**Material examined.** All specimens collected by (and in the collection of) the author unless otherwise indicated. JAPAN. Honshu: Shiga Prefecture: Gonggen-dani, 260–270 m alt., Kawachi, Tago Town, Inukami County, 3 females, 9. X. 2005, Y. Ihara leg.; Umehara, 330–340 m alt., Imazu Town, Takashima City, 1 female, 24. X. 2009, Y. Ihara leg. Osaka Prefecture: Mt. Shiroyama, 850 m alt., Izumi, Kishiwada City, 1 male, 28. III. 1997, N. Tsurusaki leg. Tottori Prefec-

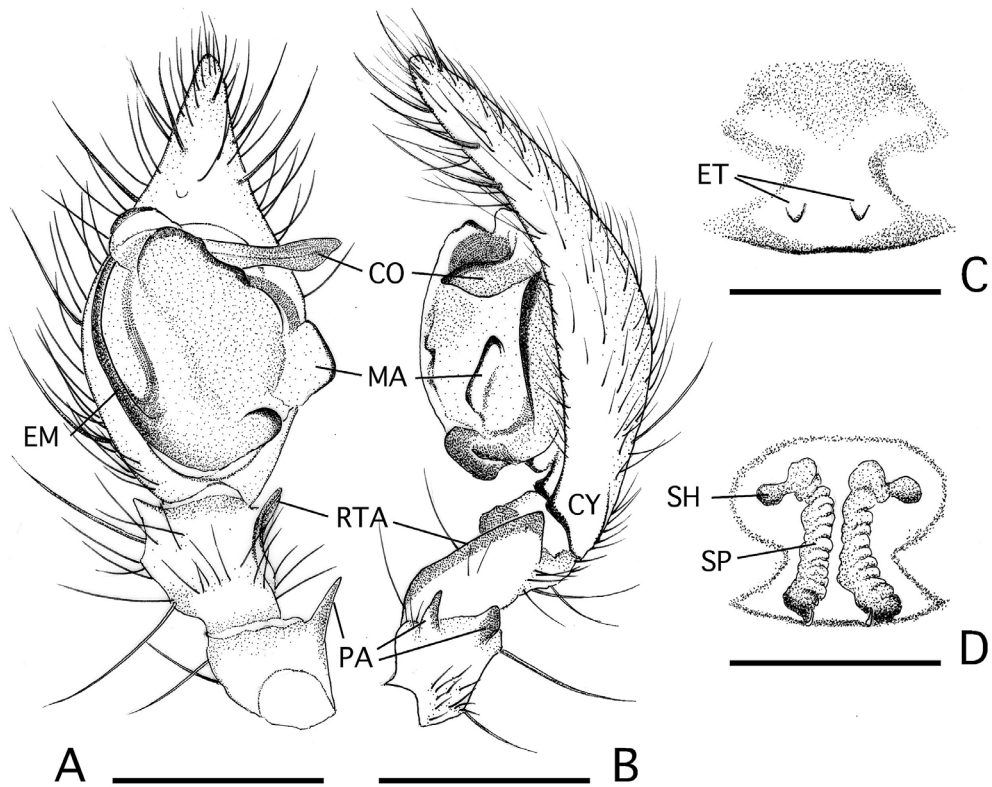


Fig. 3. *Dichodactylus tarumii* (Arita, 1976). male (A, B: NSMT-Ar 14732), female (C, D: NSMT-Ar 14733). A, ventral view of male palp; B, retrolateral view of male palp; C, ventral view of epigynum; D, dorsal view of internal female genitalia. Abbreviations: CO, conductor; CY, cymbial furrow; EM, embolus; ET, epigynal teeth; MA, median apophysis; PA, patellar apophyses; RTA, retrolateral tibial apophysis; SP, spermatheca; SH, spermathecal head. Scale bars: 0.5 mm.

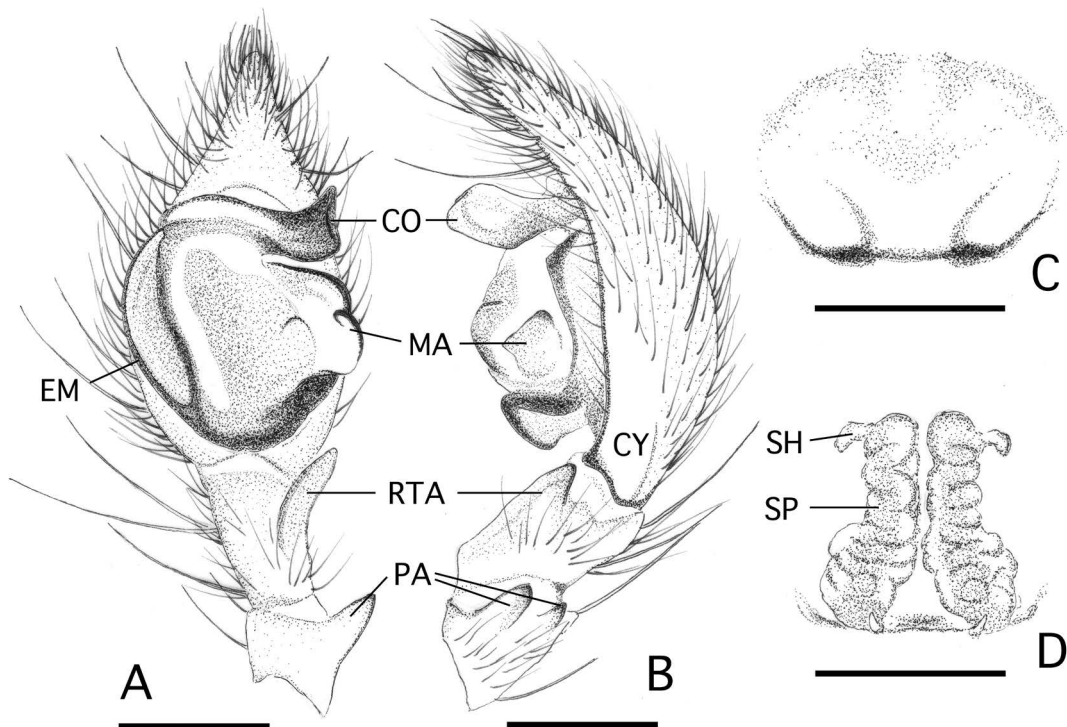


Fig. 4. *Dichodactylus satoi* (Nishikawa, 2003). male (A, B: NSMT-Ar 14735), female (C, D: NSMT-Ar 14734). A, ventral view of male palp; B, retrolateral view of male palp; C, ventral view of epigynum; D, dorsal view of internal female genitalia. Abbreviations: CO, conductor; CY, cymbial furrow; EM, embolus; MA, median apophysis; PA, patellar apophyses; RTA, retrolateral tibial apophysis; SP, spermatheca; SH, spermathecal head. Scale bars: 0.5 mm.

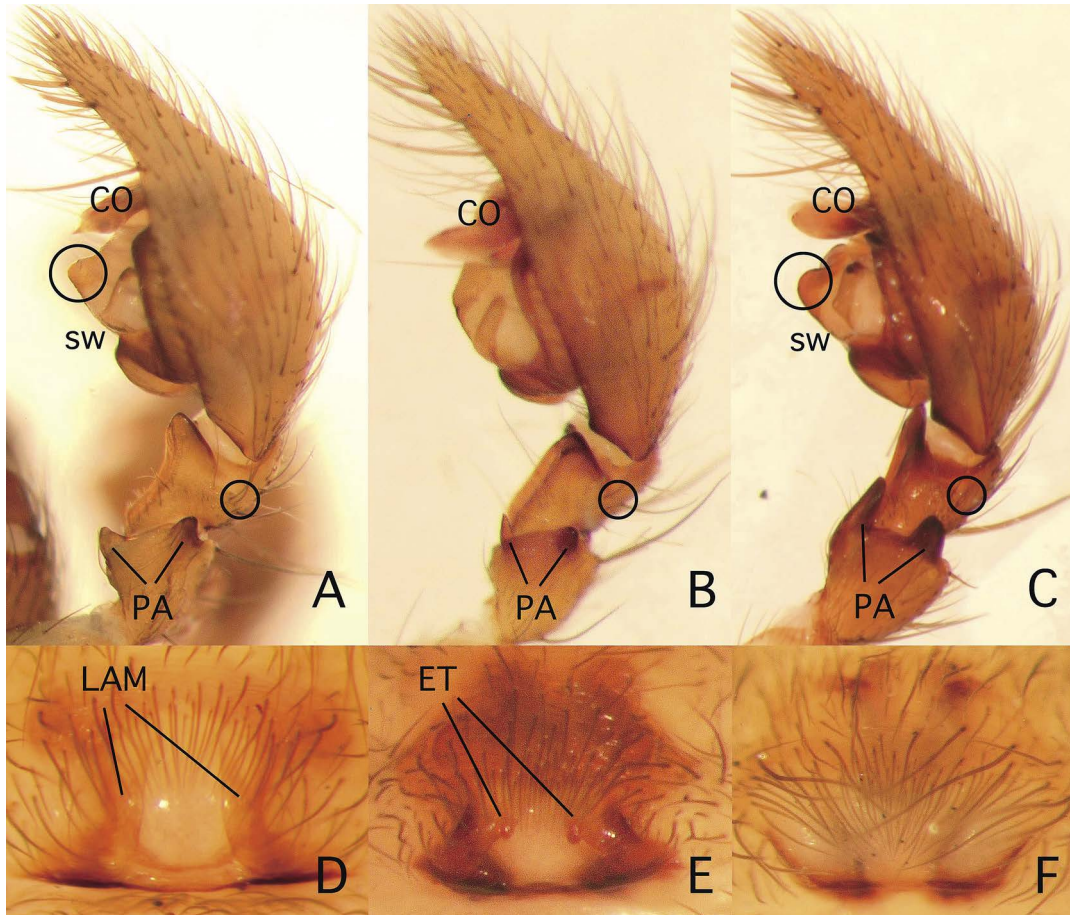


Fig. 5. Comparison of genital characters of three species of *Dichodactylus* gen. nov. from Japan: A, D, *D. shinshuensis* sp. nov., male (A: NSMT-Ar 13339), and female (D: NSMT-Ar 13341); B, E, *D. tarumii* (Arita, 1976), male (B: NSMT-Ar 14732), and female (E: NSMT-Ar 14733); C, F, *D. satoi* (Nishikawa, 2003), male (C: NSMT-Ar 14735), and female (F: NSMT-Ar 14734). A–C, retrolateral views of male palp; D–F, ventral views of epigynum. Abbreviations: CO, conductor; ET, epigynal teeth; LAM, lamellas; PA, patellar apophyses; SW, swollen portion of tegulum. Black circle on tibia shows the vestigial LTA.

ture: Mikuma Shrine, 100 m alt., Mikuma, Tottori City, 1 female, 13. I. 2012, Y. Ihara leg.; Kuritani, Fukube Town, Tottori City, 1 male and 1 female, 18. I. 2012, Y. Ihara leg.; Kasegi, Saji Town, Tottori City, 1 female, 14. X. 1990, K. Nojima leg.; Kitamura, Kawara Town, Tottori City, 2 females, 14. X. 1990, K. Nojima leg. Yamaguchi Prefecture: Kawakamitōtani, Hagi City, 1 female, 14. XI. 2006, Y. Ihara leg.; Mt. Monju, 270 m alt., Nishimigama, Suō-ōshima Town, Ōshima County, 1 male, 22. XI. 2008, Y. Ihara leg. Kyushu: Fukuoka Prefecture: Mt. Tachibana, Fukuoka City, 1 male and 4 females, 3. XI. 2006; Sugao Falls, 230 m alt., Kokuraminami Ward, Kita-kyushu City, 1 female, 24. XI. 2012; No Pass, 730 m alt., Miyako Town, Kyoto County, 1 female, 3. V. 2006; Mt. Hiko, 820 m alt., 1 female, 5. V. 2006; Chikuhō Town, 440 m alt., Kaho County, 2 males and 1 female, 4. XI. 2006. Saga Prefecture: Mt. Kinzan, 650 m alt., Mitsuse Village, Saga City, 1 male and 2 females, 5. XI. 2006; Mt. Kusenbu, 820 m alt., Tosu City, 1 female, 1. I. 2007; Kokura, 205 m alt., Kiyama Town, Miyaki County, 2 females, 27. XI. 2011. Nagasaki Prefecture: Shimabara City, 1 male, 25. X. 1985, C. Tanabe leg.; Mt. Yasuman, 470 m alt., 1 male (7. I. 2006), 1 female (2. XII. 2006), 1 male and 1 female (18. X. 2014); Kumamoto Prefecture: Kukino, Minami-aso Village,

Aso County, 1 female (9. I. 1990), Y. Ihara leg., 1 female (17. II. 1990), Y. Ihara leg. Ōita Prefecture: ōta, Kusu Town, Kusu County, 1 female, 3. V. 2006; Mt. Mae, 730 m alt., Yufu City, 5 females, 4. V. 2006; Mt. Tsurumi, 1340 m alt., Beppu City, 1 female, 18. IX. 2006; Mt. Shiritsuki, 500 m alt., Bungo-takada City, 1 female, 26. III. 2010. Two samples are deposited in NSMT (NSMT-Ar 14732, 14733).

**Diagnosis.** Male with tip of spatulate conductor extending retrolaterally. Female with pair of small, posteriorly-located epigynal teeth; copulatory ducts hidden in dorsal view of cleared epigynum.

**Description of male (NSMT-Ar 14732).** Palp (Figs 3A, B, 5B): two small patellar apophyses present; LTA reduced; RTA large and elongated; cymbial furrow short, one-seventh of the cymbial length; median apophysis semicircular; conductor spatulate, resembles that of the genus *Tegeocoelotes*.

**Description of female (NSMT-Ar 14733).** Epigynum and internal genitalia (Figs 3C, D, 5E): epigynum hourglass-shaped; epigynal teeth nipple-shaped, situated posteriorly on epigynum; spermathecae elongated anteroposteriorly, convoluted and close to each other; spermathecal heads situated anterolateral portion of spermathecae.

**Distribution.** Western Japan (Fig. 6).

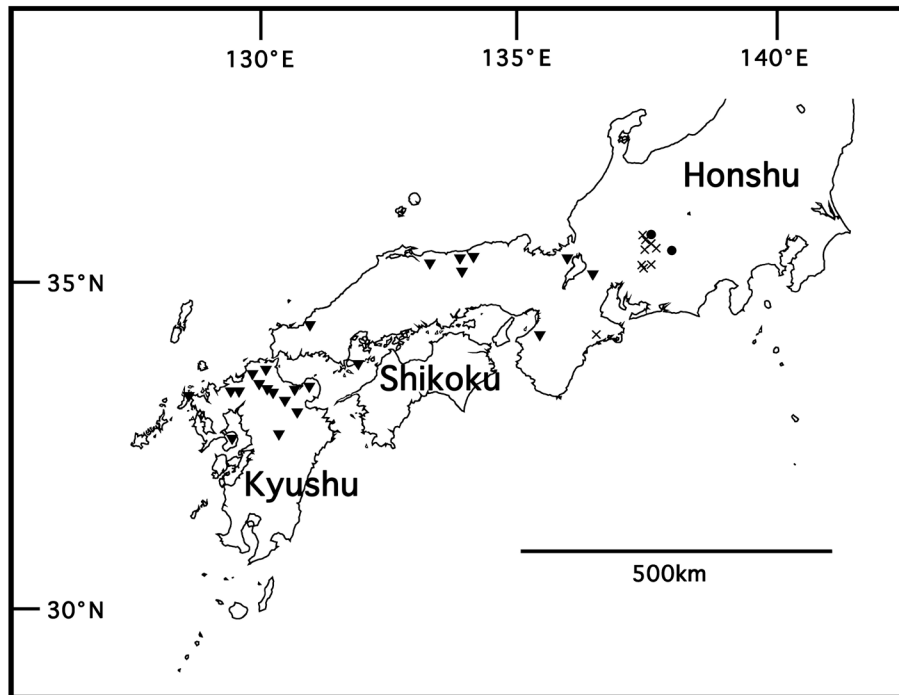


Fig. 6. Distribution of three species of the genus *Dichodactylus* gen. nov. from Japan. Closed circles denote *D. shinshuensis* sp. nov.; closed inverted triangles, *D. tarumii* (Arita, 1976); crosses, *D. satoi* (Nishikawa, 2003).

*Dichodactylus satoi* (Nishikawa, 2003) comb. nov.  
(Figs 4A–D, 5C, F, 6)

*Coelotes* sp.: Chikuni 1989: 103, fig. 24.

*Coelotes satoi* Nishikawa, 2003: 37–40, figs 1–5.

*Orumceklia satoi* Okumura *et al.* 2009: 175, figs 2-2-33-1-2-2-33-4.

**Material examined.** **Holotype:** female, Mt. Ena-san, 840 m alt, Okunodaira. Nakatsugawa City, 2. XII. 1993, Y. Nishikawa leg (NSMT-Ar 14602). **Allotype:** male, same data as the holotype (NSMT-Ar 14603). Non-type materials: Japan. Honshu: Gifu Prefecture: Tochibaradani, 950 m alt., Ochiai, Osaka Town, Gero City, 1 female, 14. X. 2009, Y. Ihara leg.; Maruno, 720 m alt., Kawakami, Nakatsugawa City, 1 female (NSMT-Ar 14734), 21. IX. 2010, Y. Ihara leg.; Shizumo, 350–360 m alt., Yamaguchi, Nakatsugawa City, 1 male (NSMT-Ar 14735) and 1 female, 21. IX. 2010, Y. Ihara leg. Mie Prefecture: Fujisaka Pass, Taiki Town, Watarai County, 1 male, 21. X. 2000, K. Nojima leg. All the specimens are in my private collection.

**Diagnosis.** Male with tip of spatulate conductor bent at right angles and extending distally. Female with hexagonal epigynum without epigynal teeth and hoods, and with copulatory ducts hidden in dorsal view of epigynum.

**Description of male (NSMT-Ar 14735).** Palp (Figs 4A, B, 5C): patellar apophyses thick, retrolateral one elongated; LTA reduced; RTA large and elongated; cymbial furrow short, one-seventh of the cymbial length; median apophysis semicircular; conductor spatulate and its tip becomes broad, tegulum with swollen portion visible in retrolateral view.

**Description of female (NSMT Ar 14734).** Epigynum

and internal genitalia (Figs 4C, D, 5F): epigynum hexagonal-shaped; epigynal teeth absent; spermathecae elongated anteroposteriorly, convoluted and close to each other; spermathecal heads situated anterolateral portion of spermathecae.

**Distribution.** Central Japan (Fig. 6).

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