

Figures 150–157: *Iurus asiaticus*. **150–154.** Male, Çamlıyayla, Mersin, Turkey. **155–157.** Female, 4 km E Kaşlıca Village, Adıyaman, Turkey. **150.** Carapace and close-up of lateral eyes. **151.** Stigma III, left. **152.** Telson and metasomal segments IV–V, lateral view. **153.** Sternite VII. **154.** Sternoplectinal area. **155.** Sternoplectinal area. **156.** Right chelicera, ventral and dorsal views. **157.** Tarsus and partial basitarsus, right leg IV.

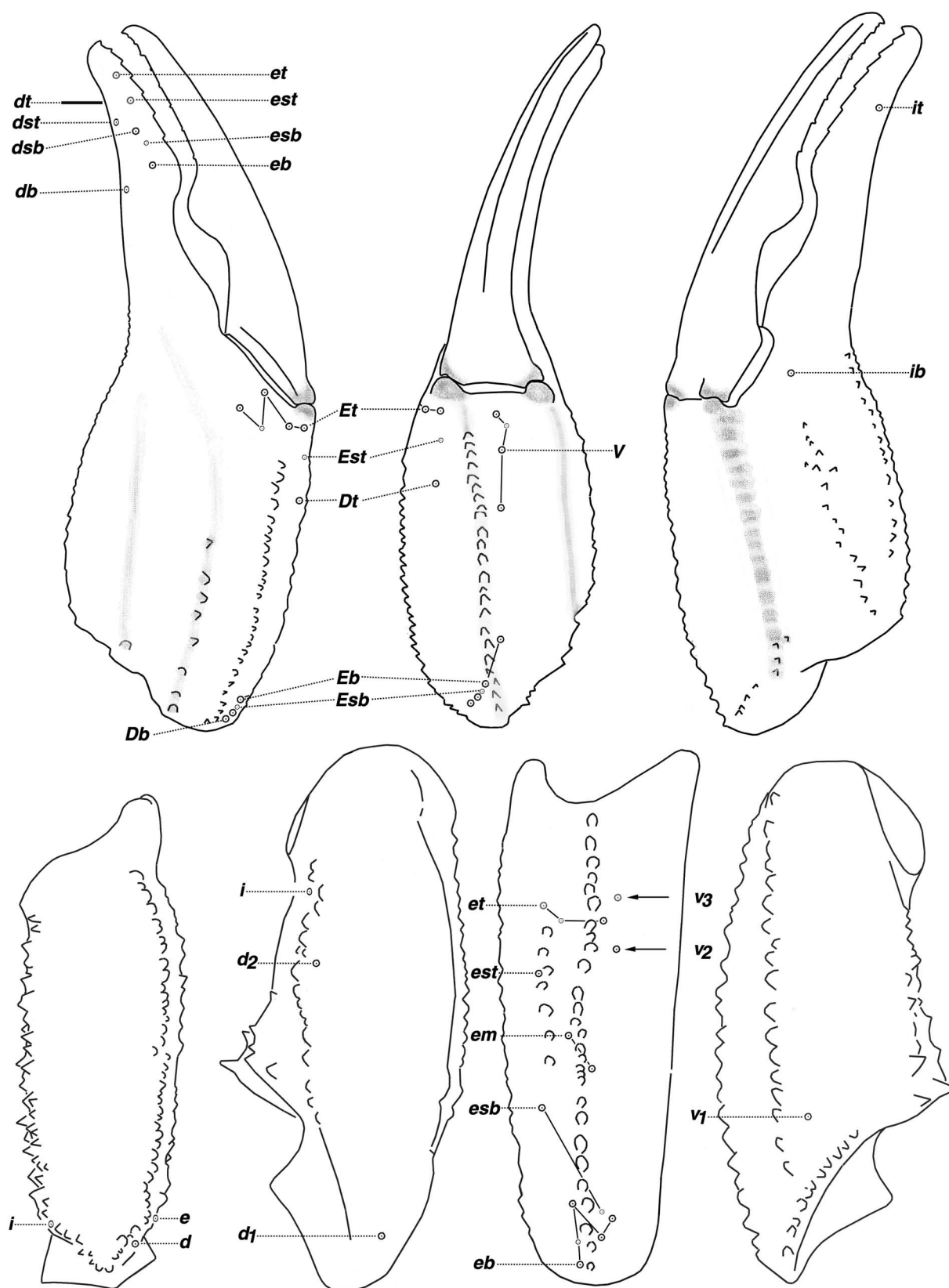
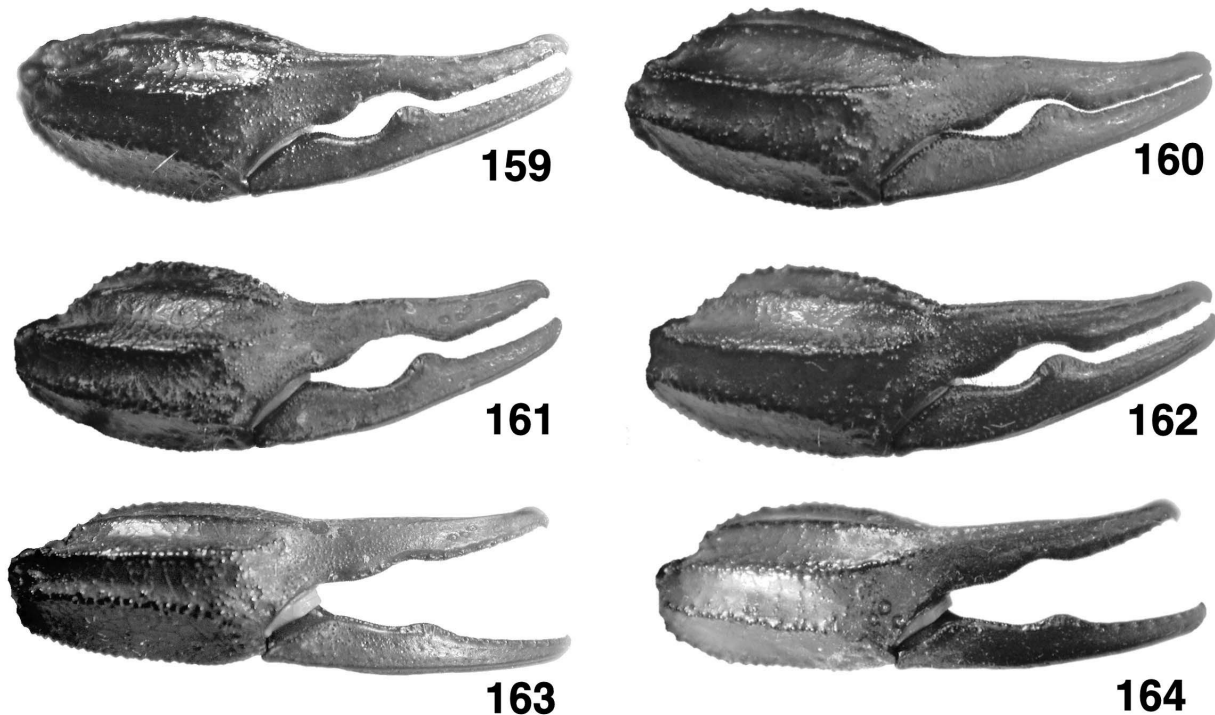


Figure 158: Trichobothrial pattern of *Iurus asiaticus*, male. Çamlıyayla, Mersin, Turkey.



Figures 159–164: Chela, lateral view, *Iurus asiaticus*, adults unless otherwise stated. **159.** Male, Kaşlıca, Adıyaman, Turkey. **160.** Male, Yaylaüstü Village, Kahramanmaraş, Turkey. **161.** Male, Eski Mantas Village, Adana, Turkey. **162.** Male, Çamlıyayla, Mersin, Turkey. **163.** Female, Kaşlıca, Adıyaman, Turkey. **164.** Female, Yaylaüstü Village, Kahramanmaraş, Turkey. Note, in adults, the movable finger lobe is positioned distal of finger midpoint and the fixed finger proximal gap is conspicuously present in adult males.

PEDIPALPS (Fig. 158). Well-developed chelae, with long fingers, heavily carinated, scalloping of chelal fingers conspicuous: lobe on movable finger visible, positioned slightly beyond midpoint; proximal gap of fixed finger well-developed. **Femur:** Dorsointernal, dorsoexternal and ventrointernal carinae serrated, ventroexternal rounded. Dorsal and ventral surfaces irregularly granulated, internal and external surfaces with line of 12 and 17 serrated granules, respectively. **Patella:** Dorsointernal and ventrointernal carinae serrated, dorsoexternal and ventroexternal rounded and crenulated; exteromedian carina strong, serrated, and doubled medially. Dorsal surface sparsely granulated; ventral surface smooth; external surface smooth with serrated exteromedian carina; internal surface smooth, with well-developed, doubled DPS and VPS. **Chelal carinae:** Complies with the “8-carinae configuration”. Digital (*D1*) carina strong, smooth to granulated; dorsosecondary (*D3*) smooth with subtle granulation; dorsomarginal (*D4*) serrated, doubled; dorsointernal (*D5*) serrated; ventroexternal (*V1*) strong and serrated, terminating to external condyle of movable finger; ventrointernal (*V3*) rounded, smooth to granulated, continuous to internal condyle; external (*E*) strong, continuous, and serrated; internal (*I*) irregularly serrated. **Chelal finger dentition:** Median

denticle (*MD*) row groups oblique and highly imbricated; 10/10 *ID*s on fixed fingers and 12/12 *ID*s on movable fingers; 10/10 *OD*s to socket on fixed fingers and 15/15 *OD*s on movable fingers. No accessory denticles present. **Trichobothrial pattern (Fig. 158):** Type C, orthobothriotaxic, typical of genus (but see below on neobothriotaxy in this species).

LEGS (female, Fig. 157). Both pedal spurs present on all legs, lacking spinelets; tibial spurs absent. Tarsus with conspicuous spinule clusters in single row on ventral surface, terminating distally with a pair of enlarged spinule clusters. Unguicular spine well-developed and pointed.

HEMISPERMATOPHORE (Figs. 165–171). We have examined several hemispermatophores of *I. asiaticus*, spanning major parts of its distribution range (Mersin, Kahramanmaraş, and Adıyaman Provinces; see map in Fig. 60). The hemispermatophore of *I. asiaticus* is unique among *Iurus* species, exhibiting a short lamina with a pointed terminus, a wide pointed medially positioned internal nodule, absence of transverse trunk bolsters, and a truncated acuminate process terminus (see below for more data).

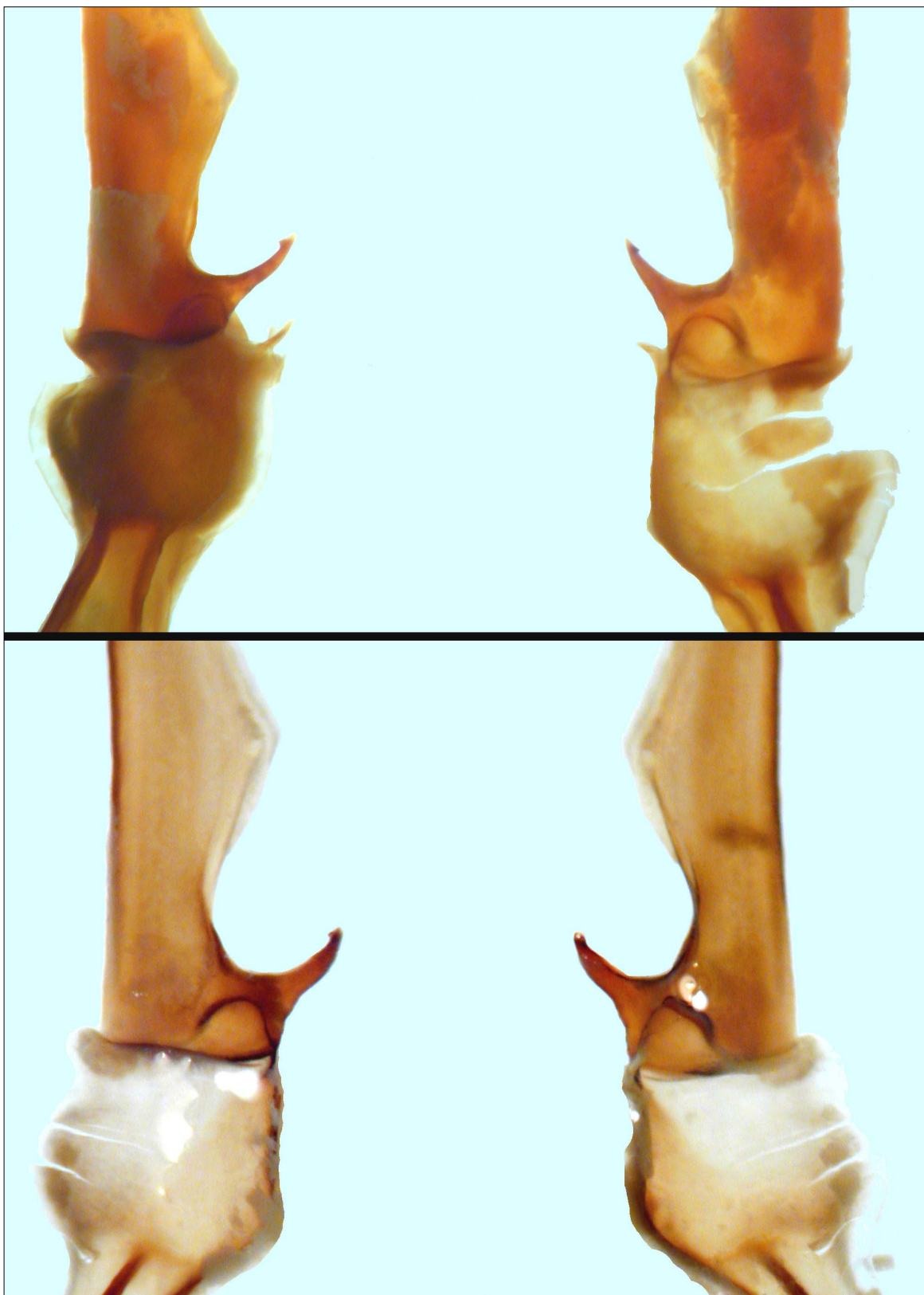


Figure 165: Close-up of median area of hemispermaphore, *Iurus asiaticus*. **Top.** Right hemispermaphore, dorsal and ventral views, Tut District, Adiyaman, Turkey. **Bottom.** Right hemispermaphore, dorsal and ventral views, Central District, Kahramanmaraş, Turkey.

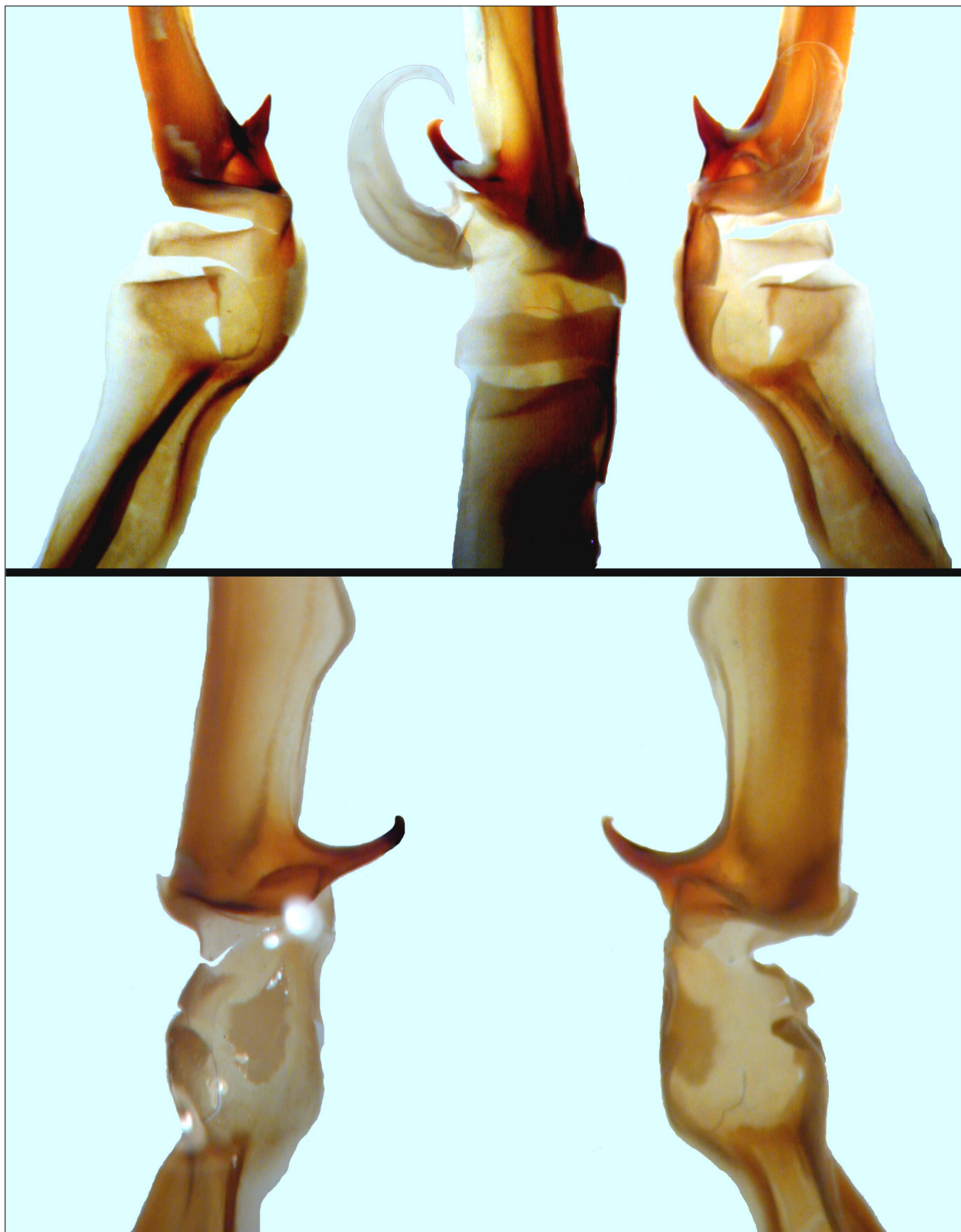


Figure 166: Close-up of median area of right hemispermaphore, *Iurus asiaticus*, Çamlıyayla, Mersin, Turkey. **Top.** Externodorsal, internoventral, and ventrointernal views. Note, a lightly sclerotized fragment has peeled away from median area. **Bottom.** Dorsal and ventral views.

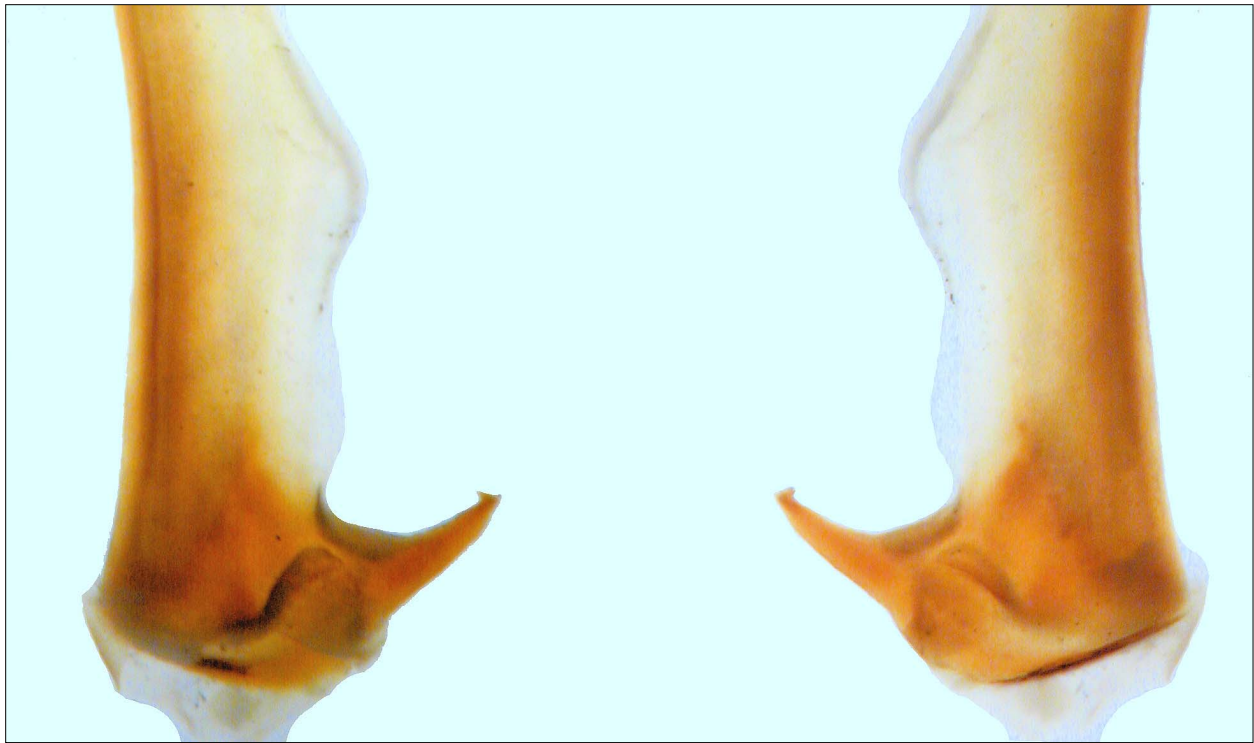


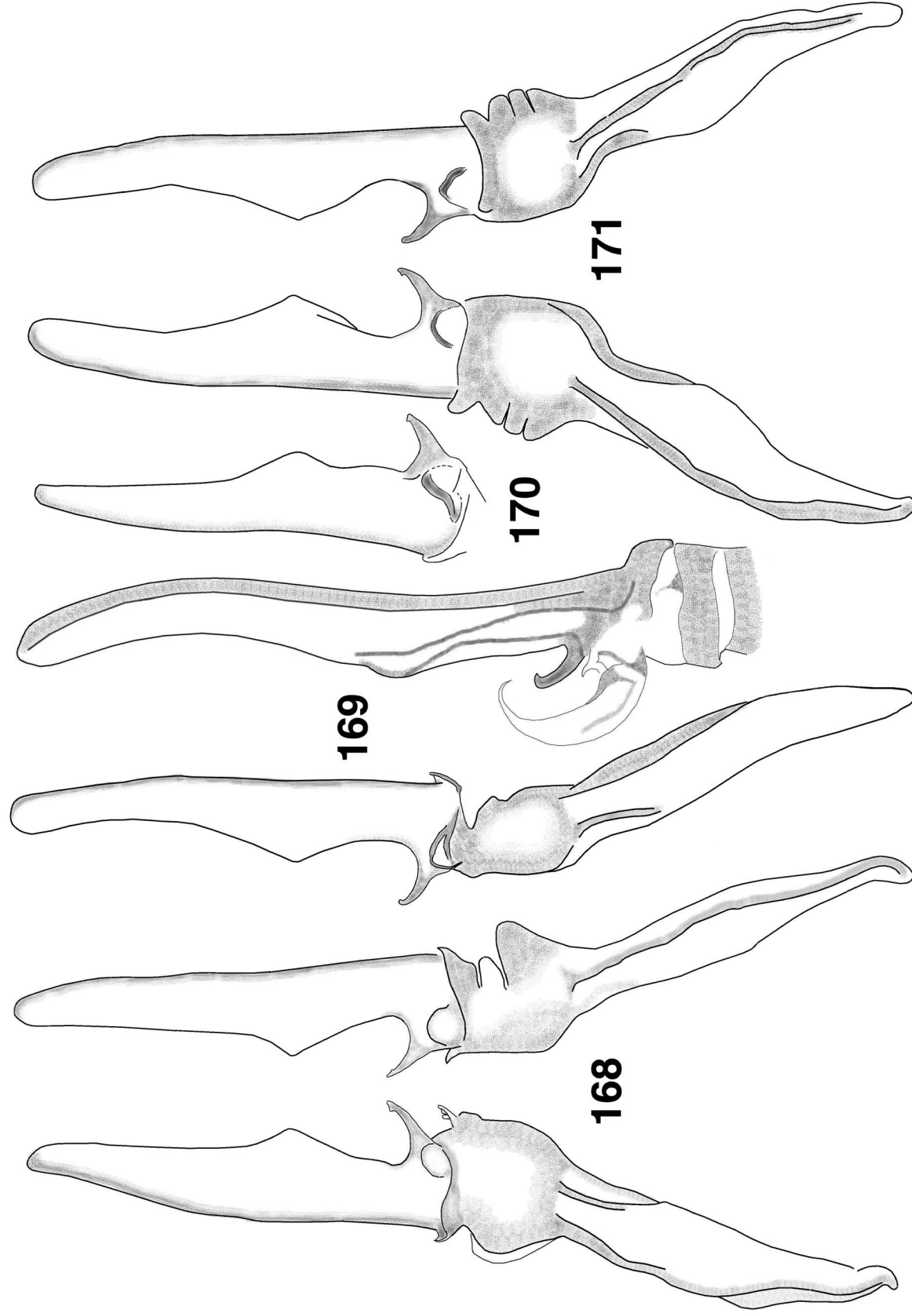
Figure 167: Close-up of median area of left hemispermatophore, *Iurus asiaticus*, ventral and dorsal views. Tarsus, Mersin, Turkey. Note a well developed internal nodule, a truncated acuminate process terminus, and a seminal receptacle in ventral view (reflection of receptacle is visible in dorsal view).

Male and female variability. The overall morphology of the chela exhibits significant sexual dimorphism (Figs. 159–164). In the sexually mature male, the movable finger lobe is conspicuous, fitting into an equally well developed fixed finger socket with a proximal gap. In the female, the lobe and socket are not as developed and the proximal gap is missing. There is no significant sexual dimorphism in morphometrics. The metasomal segments are relatively longer in the male, but the MVDs across all five segments only favored the male by 4.6 to 9.0 % when compared to the segment's width. Pectinal tooth counts in males exceed those of females by approximately one tooth (1.09), male 10–13 (11.67) [18], female 9–12 (10.58) [22] (see histograms in Fig. 73). The genital operculum of the male is different from that in the female (Figs. 154–155). The sclerites, subtriangular in shape, are as long as or longer than wide in the male, whereas in the female the sclerites are short and wide, more than twice as wide as long. Whereas the sclerites are fused medially in the female, they are separated along their entire length in the male, exposing significantly developed genital papillae. The enlarged genital operculum of the male extends distally between the lateral lobes of the sternum partially obscuring its proximal region. Figures 172–173 and 177–180 show dorsal and ventral views of both male and female specimens, and various collection localities for this species.

Lectotype analysis

Three specimens from Gülek were first mentioned by Birula (1898) as *Iurus dufourei*; these were likely the first Anatolian specimens of *Iurus* available to researchers. The subspecies *Iurus dufourei asiaticus* was described, however, only five years later when Birula had a chance to compare it to the Crete and mainland Greece specimens. In a very brief comparative paragraph, Birula (1903) wrote (talking about a population of *Iurus dufourei* from Crete) (Figs. 174–176):

[p. 297:] [p. 297:] "Two good specimens from the vicinity of the town of Candia [now Iraklio, Crete] - one female with 9 pectinal teeth, about 82 mm long, another, probably male, with larger pectines (also with 9 teeth) and a triangular genital plate, 74 mm long. Both of these specimens do not differ from specimens found in [mainland] Greece (10–11 pectinal teeth); however, the Anatolian (Gülek specimens) somewhat differ from the typical ones (from Greece) in the following: the larger female from Gülek is dark-brown with strong green shine; telson ventrally strongly hirsute; chela dorsally with distinct but smooth carinae; carapace coarsely granulated, but with smooth spaces between the rows of granules; metasomal segment I somewhat rough between ventral carinae; [p. 298:] also pectines with 12 teeth. Thus Anatolian specimens can be, not without a jus-



Figures 168–171: Hemispermatophore, *Iurus asiaticus* (right hemispermatophore unless stated otherwise). **168.** Tut District, Adiyaman, Turkey, dorsal and ventral views. **169.** Çamlıyayla, Mersin, Turkey, left, ventral view, right, ventrointernal view. Note, a lightly sclerotized fragment has peeled away from median area. **170.** Tarsus, Mersin, Turkey, left hemispermatophore, ventral view. **171.** Central District, Kahramanmaraş, Turkey, dorsal and ventral views.

<i>Iurus asiaticus</i> Birula, 1903						
	Çamlıyayla, Mersin, Turkey	Kaşlıca Village, Adıyaman, Turkey			Yaylaüstü Village, Kahramanmaraş, Turkey	
	Male	Male	Female	Female	Male	Female
Total length	72.90	84.05	82.60	88.15	83.50	80.80
Carapace length	11.35	12.10	12.15	12.75	11.65	11.45
Mesosoma length	20.30	25.40	27.95	30.45	28.95	30.50
Metasoma length	29.20	33.70	30.30	32.30	30.80	27.30
Segment I length/width	3.95/4.55	4.45/4.80	4.20/4.95	4.30/5.20	4.30/4.85	3.65/4.65
Segment II length/width	4.55/4.00	5.20/4.50	4.70/4.30	4.90/4.55	4.90/4.30	4.20/4.25
Segment III length/width	4.95/3.70	5.50/4.10	5.20/3.90	5.40/4.20	5.30/4.00	4.60/3.80
Segment IV length/width	6.00/3.35	6.70/3.70	6.05/3.50	6.60/3.75	6.15/3.55	5.45/3.45
Segment V length/width	9.75/3.15	11.85/3.55	10.15/3.30	11.10/3.55	10.15/3.30	9.40/3.25
Telson length	12.05	12.85	12.20	12.65	12.10	11.55
Vesicle length	8.45	9.20	8.40	9.15	8.65	7.90
width/depth	3.25/3.10	3.95/3.50	3.60/3.35	3.75/3.50	3.65/3.35	3.30/3.00
Aculeus length	3.60	3.65	3.80	3.50	3.45	3.65
Pedipalp length	43.20	50.45	48.00	49.70	48.60	42.55
Femur length/width	11.40/3.90	12.95/4.05	12.40/4.20	12.85/4.40	12.10/4.10	10.80/3.35
Patella length/width*	10.45/4.10	12.10/4.30	11.45/4.20	12.10/4.55	11.10/4.25	10.15/3.90
DPS height**	1.35	1.60	1.30	1.70	1.70	1.40
Chela length	21.35	25.40	24.15	24.75	25.40	21.60
Palm length	10.25	11.85	11.60	11.85	11.00	10.40
width/depth	5.60/7.25	6.60/8.65	5.95/7.65	6.40/8.30	6.30/8.10	6.15/7.10
Fixed finger length	10.20	11.85	11.35	12.10	11.10	10.05
Movable finger length	13.05	14.90	14.35	15.30	14.25	-
Pectines teeth	13-13	11-10	11-11	12-11	11-11	11-11
middle lamellae	2-2++	3-4	3-3	2-2	3-3	1-2
Sternum length/width	2.75/2.50	3.15/2.25	3.25/2.60	3.45/2.70	2.90/2.15	3.25/2.80

Table 6: Morphometrics (mm) of *Iurus asiaticus* Birula, 1903. * Patella width is widest distance between the dorsointernal and externomedial carinae. ** DPS height is from tip of spines to dorsointernal carina center.

tification, separated as a subspecies of *Jurus dufourei* (Brullé), which I name here *Jurus dufourei asiaticus* Birula, 1903." (transl. from German).

We received photographs (courtesy of Viktor Krivochatsky, November 2008) of all three Birula's original syntypes (ZISP 1066; see log sheet in Fig. 175): dorsal and ventral views of a subadult female, pectinal teeth 10; dorsal and ventral views of a subadult male; and dorsal views of an adult female (presumably with 12 pectinal teeth). Fig. 174 shows this adult female, which we designate here as a lectotype of *Iurus asiaticus*. Fig. 176 shows the original type series label for this species.

In the photograph of the female lectotype, we can observe the following: the movable finger lobe of the chela is positioned distally on the finger, in a ratio of 0.517; a proximal gap is not present on the fixed finger;

and the interocular area of the carapace is somewhat smooth, delineated by the strongly developed mediolateral ocular carinae. Morphometric ratios derived from the pedipalp chela of the female lectotype (the chelal length as compared to the palm depth, movable finger length, and palm length) are consistent with those of three adult females of *I. asiaticus* measured in this study (see Table 6). Finally, the movable finger lobe ratio of the female lectotype is consistent with that for *I. asiaticus* (see scatter chart in Fig. 56).

Discussion

I. asiaticus has the second most distally positioned movable finger lobe in the genus, only exceeded by that



Figure 172: *Iurus asiaticus*. Dorsal view. Adult male, 2 km W Yaylaustu Village, Kahramanmaraş, Turkey.

of *I. kraepelini*. The movable finger lobe ratio is larger in the male than in the female, 0.475–0.580 vs. 0.460–0.540 (ratios calculated from adults with carapaces 11 mm long or larger; see scatter chart in Fig. 56 for a complete analysis of this character).

The hemispermatophore of *I. asiaticus* (Figs. 165–171) has been examined from four specimens, each from a separate locality (see map in Fig. 60). Unique to this species is the relatively short lamina. As can be seen in Tables 2 and 3, *I. asiaticus* exhibits the smallest morpho-

metric ratio values across all species in *all* four ratios. In part, this is due to the relatively short lamina: when the lamina length is compared to the trunk length, *I. asiaticus* shows a 22 to 68 % in MVD; and in the ratio that compares the lamina distal length to its basal length, we see MVDs of 48 to 172 %, a very significant value. The lamina terminus is somewhat pointed, especially when compared to its wide and pointed internal nodule. The internal nodule is situated suprabasally on the lamina, in a ratio 1.7. The acuminate process terminus is



Figure 173: *Iurus asiaticus*. Dorsal view. Adult female, 4 km E Kaşlıca Village, Adıyaman, Turkey.

truncated as in most other *Iurus* species. Transverse trunk bolsters are absent. The paraxial organ sleeve was not detected in the five hemispermatophores examined.

In Appendix C, we present a complete analysis of the morphometric trends across the five species of *Iurus*. This analysis shows that the palm length of *I. asiaticus* dominated in a large majority of morphometric ratio comparisons: averaging 20 comparisons out of 25 for

males and 24 for females. This dominant morphometric was combined with the telson length, a measurement with the least dominance in ratio comparisons (it only dominated in five to six morphometric comparisons), to form a diagnostic character for *I. asiaticus*. Figure C7 in Appendix C presents the histograms of the chela palm length as compared to the telson length. This morphometric, consistent in both genders, provides decent



Figure 174: *Iurus asiaticus* Birula, 1903, female lectotype, Gülek Pass (Gülek Boğazı, Cilician Gates), Taurus Mts., Adana, Turkey (photograph courtesy of Viktor Krivochatsky, St. Petersburg, Russia). The left pedipalp is situated closer to the photographic plane and therefore is somewhat out of focus.

diagnostic separation for *I. asiaticus* from the species closest geographically, *I. kraepelini*, exhibiting 12.2 and 18.8 % MVDs for the male and female, respectively.

Only once was neobothriotaxy encountered among the 20 specimens of *I. asiaticus* examined, in a male

from Çamlıyayla District, Mersin Province. See Appendix B for more information.

Material Examined (31 specimens). TURKEY: *Adana Province*: Kozan District, Eski Mantaş Village, Beşiktaş

Иурис дуфурейус (Земн.)										Наземн. жив.	
										Листъ	
№ входящаго журн.	Число экз.			Полъ.	МѢСТО СБОРА.	Время сбора.	КОЛЛЕКТОРЪ.	Кто опредѣлялъ.	ОТМѢТКА.		
	Слнпр.	Сухихъ.	Мнѣр. прен.								
1066. ✓ (634)	3				Земл. Малая Азия: Киликия - в-ва { Марса - Гюлек (1300 м) 1897		М. Holtz	A. Birula.	126-97		
1067. ✓	2			?	в-ва Крымъ: Кандис	24 X 1898	Dr. Bogolyubov	"			
1068. ✓	1			♀	Пелопоннесъ (Тресис) { Магнесия		М. Holtz	"			
Registration number	Number of specimens			Gender	Locality	Date ["old calendar"]	Collector	Who identified	Notes		
	in alcohol	dry	microscope slides								
1066 (654)	3			♀ + 2 pul.	Asia Minor, Cilician Taurus - Gulek (1300 m)	May - August 1897	M. Holtz	A. Birula	No 126-97		
1067	2			?	Crete Island, Candia	24 October 1898	Dr. Bogolyubov	"			
1068	1			♀	Peloponnese (Greece), Taygetos		M. Holtz	"			

Figure 175: *Iurus* specimens from Birula's collection deposited in ZISP (St. Petersburg, Russia). **Top.** the original handwritten (in Birula's hand) collection list in the museum journal from ZISP (courtesy V. A. Krivochatsky, ZISP). **Bottom.** Translation from Russian. The first entry (ZISP 1066) is the type series of *Iurus asiaticus* (see vial label at Fig. 176) while two other entries refer to *I. dufourae*; the specimen from Crete (ZISP 1067) collected by Bogolyubov was mentioned by Birula (1903).

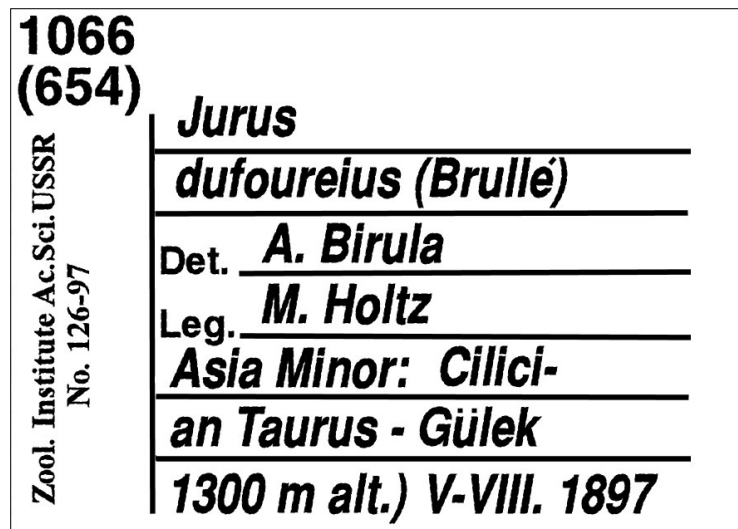
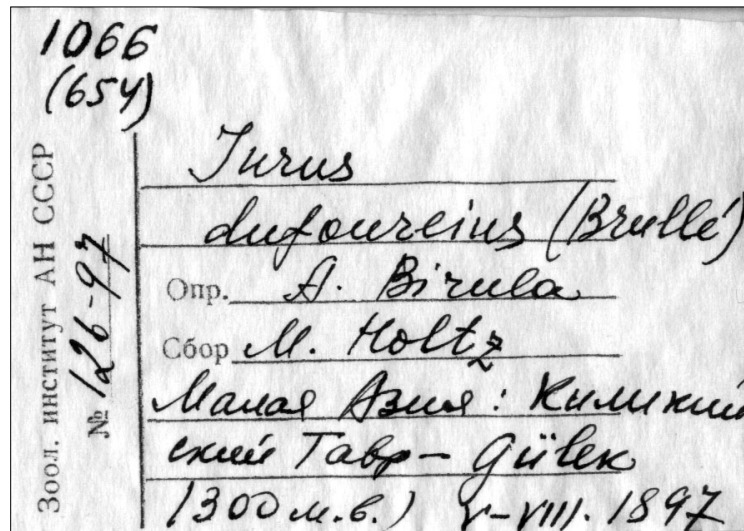


Figure 176: Locality label for original type series of *Jurus asiaticus*. **Top.** Original label. **Bottom.** English translation.

area, 37°30'43"N, 35°52'31"E, 29 August 2004, 450 m asl, 1 ♂, leg. E. A. Yağmur & H. Karaoglu (MTAS); Pozantı District, Belemelik ("Belemelik Mara, Baracken"), 1914, 1 ♂, 1 ♀, 2 imm. (SMFD 24518); Pozantı District, E of Pozantı, 37°26'02"N, 34°53'57"E, 8 June 2007, 1 ♂ sbad., 1 ♂ juv., leg. E. A. Yağmur & A. V. Gromov (MTAS). *Adıyaman Province*: Tut District, 4 km E of Kaşlıca Village, southern slopes of Akdağ Mts, 37°48'34.6"N, 37°59'21.9"E, 1183 m asl, 8 June 2007, 1 ♂, 1 ♂, 5 ♀, 1 ♀ juv. (MTAS), 1 ♂, 1 ♀ sbad. (FKCP), leg. E. A. Yağmur & G. Çalışır. *Kahramanmaraş Province*: Central District, Süleymanlı Village, 23 April 1966, 1 ♂, 1 ♀ sbad. (NHMW); Central District, 2 km W of Yaylaüstü Village fork in the road to Andırın, 37°34'33"N, 36°35'6"E, 1237 m asl, 21 June 2007, 1 ♀ sbad., leg. M. Z. Yıldız (MTAS), 23

June 2007, 1 ♂, 1 ♂ juv., 3 ♀ sbad., leg. E. A. Yağmur, M. Yalçın & S. Dudaklı (MTAS). *Mersin Province*: Çamlıyayla District, Namrun (now Çamlıyayla), 16 May 1967, 1 ♂, leg. F. Ressler (NHMW 11325); Çamlıyayla District, near Çamlıyayla Village, 1100–1200 m, 9 May 1998, 1 ♀ sbad., leg. A. Plutenko (FKCP); Çamlıyayla District, Çamlıyayla Plateau, 37°08'19"N, 34°50'25"E, 425 m asl, 12 May 2008, 1 ♀, leg. A. Akkaya & İ. H. Uğurtaş (MTAS); Tarsus District, "Hacı Hamfal" (?Hacı Hamzalı), 1 ♂ (MNHN RS 3007); Tarsus District, 1 km from Taşobası Village, 37°05'55"N, 34°55'40"E, 209 m asl, 24 April 2009, 1 ♂ sbad., leg. M. Z. Yıldız (MTAS). *Niğde Province*: Ulukışla District, Madenköy Village, 1710 m asl, 27 July 1970, 1 ♀, leg. F. Spigenberger (NHMW 70/282).



Figure 177: Collection locality of *Iurus asiaticus*. Taşobası Village, Mersin, Turkey.