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Systematic revision of the genus *Yllenus* SIMON, 1868 (*Araneida*, *Salticidae*)

Rewizja systematyczna rodzaju *Yllenus* SIMON, 1868 (*Araneida*, *Salticidae*)

Систематическая ревизия рода *Yllenus* SIMON, 1868 (*Araneida*, *Salticidae*)

[With 185 figures in the text]

I. INTRODUCTION

The development of systematic studies on the spider family *Salticidae* is at present in a critical stage. A large number of species and genera have been described and there is a very useful catalogue (BONNET, 1945–1961) which gives comprehensive information on all necessary references, distribution and synonyms of all species. This enormous material of described species remains, however, in almost the same state in which it was left by the prominent arachnologists of the nineteenth century. The basic outline of the taxonomy of the *Salticidae* has been worked out by E. SIMON (1868, 1899). Contemporary and later authors who contributed to our knowledge of the family never attempted to revise it critically. Thus although our knowledge of the Salticid fauna of some limited areas (especially in Europe) has increased greatly, research methods have improved, and the list of described species extended, still the systematics of the family has hardly changed since the time of SIMON.

Any systematic analysis is impossible without comparison of the species or genera concerned with related ones. In the case of the revision of the *Salticidae*, the possibilities of such a comparison are still regrettably limited, except in a few of the better studied areas. The types are scattered in various collections often poorly managed, and examination of them is difficult if not im-

ssible. Without examination of types, however, no conclusions can be accepted as authoritative. The descriptions and drawings, especially in older papers, do not always give a true impression of the animal and are often completely misleading. In some cases the author has discovered that the drawings and descriptions are completely different from the specimens they are supposed to represent. In addition the characters assumed as diagnostic for some genera appeared in some cases to be present in only a few species or to be present in a quite different genus as well.

It seems that at present no broad conclusion concerning the systematics of the family *Salticidae* as a whole is possible. The first task is to revise all already described material, species by species and genus by genus, before any synthesis is possible. Such partial revisions are urgently needed.

The present paper is an attempt to revise a single genus and is based on all obtainable material. It covers 17 species included by various authors in the genus *Yllenus* SIM. and 5 other species described as new ones. The results and conclusions have in many cases been based on a small number of specimens, some of which are in a poor state of preservation. Consequently it is likely, when more material is available and when related genera have been revised, that the conclusions presented here will have to be modified. Hence the systematic proposals suggested in this paper should be regarded as provision, and they require confirmation from the results of studies of related genera.

The preparation of the present paper would not have been possible without the kind collaboration and assistance of a number of institutions and scientists. The author wishes to express his warm gratitude for the following institutions which kindly let him study their valuable materials: Naturhistorisches Museum — Basel, Természettudományi Múzeum — Budapest, Zoological Museum of the University — Florence, Museo Civico di Storia Naturale — Genova, Museum of Comparative Zoology — Harvard University, Zoological Museum — Helsinki, Zoological Museum — Moscow University, Department of Zoology — Oxford University, Muséum National d'Histoire Naturelle — Paris, Naturhistoriska Riksmuseet — Stockholm, Senckenberg Natur-Museum — Frankfurt a. M.¹

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¹ The material kept in these institutions are quoted elsewhere in the paper as: NH-Basel, TMA-Budapest, MZU-Florence, SMF-Frankfurt a. M., MCSN-Genova, MCZ-Harvard, ZM-Helsinki, ZM-Moscow, DZ-Oxford, MNHN-Paris, NHRM-Stockholm. The specimens in the collection of the Institute of Zoology, Polish Academy of Sciences, Warsaw are quoted as I. Z. PAN-Warszawa.

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II. METHODS

The research had to be based on preserved material from various museum collections. The number of available specimens was rather small and in some cases the author had but single specimens. The state of preservation of the specimens was often poor. As far as it was possible, type specimens were examined, but failing this specimens identified by their authors were studied. Only in a few cases was such material not available.

The specimens were examined in a Petri dish with the bottom covered with wax. They were pinned to the wax with fine entomological needles, covered with alcohol and examined under a "Citoplast" stereomicroscope (Zeiss, Jena) with a magnification of 63× or 100×. The drawings have been made with the aid of a reticular eyepiece micrometer and drawn on millimetre squared paper.

After drawing the epigynal plate of the females, the epigynum was cut out and macerated in 5–10% KOH for 14–72 hours at normal room temperature. Afterwards the epigynum was rinsed in distilled water and mounted in Canada Balsam or Faure-Berlese Liquid. The drawings of slides were executed with the aid of a reticular micrometer or, in some cases, the slides were photographed and the drawings done from the photographs. In these cases details of the drawings were verified afterwards by comparison with the slides.

The measurements were made with the aid of a reticular micrometer (mesh 0.5 mm) calibrated in hundredths of a millimetre for each magnification. The measurements of the segments of the legs were taken along the mid-dorsal line of the segment. The length of the tarsal segment was measured together with the length of the claws, because the tip of the tarsus is often completely hidden by dense setae. The quotation order of particular segments elsewhere in the text is as follows: tarsus, metatarsus, tibia, patella and femur. The lengths of cephalothorax and abdomen were measured along their mid-dorsal lines. The width of the eye field was measured between the external margins of the eyes of the first (quoted as "width of eye field I") and third (quoted as "width of eye field III") row respectively. If the margins were not visible, the measurements were taken between the most external points of the eyes. The measurements of the length of the cephalothorax and of the eye field were taken from the anterior margin of the cephalothorax between the anterior median eyes. As the posterior margin of the eye field, the line joining the posterior margins of eyes III was chosen. The diagram explaining how the measurements were taken is given in fig. 1.

¹ The paper has been completed and written during author's employment in the Department of Zoology, University of Ghana, Legon.

The measurements are given separately for males and females. If more than three specimens were obtainable, the biggest and smallest measurements are given, as well as the mean of all measurements.

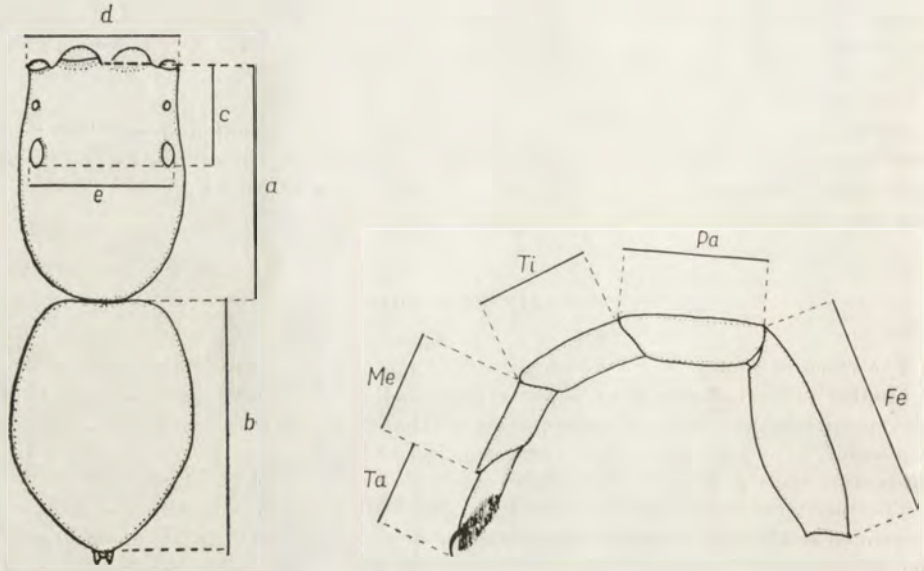


Fig. 1. Diagram of measurements: a — length of cephalothorax, b — length of abdomen, c — length of eye field, d — width of eye field I, e — width of eye field III, Ta — length of tarsus, Me — length of metatarsus, Ti — length of tibia, Pa — length of patella, Fe — length of femur.

The measurements enable the following ratios to be determined:

- ratio of length of eye field to length of cephalothorax (quoted in text as "ratio a"),
- ratio of length of anterior (width of eye field I) to length of posterior (width of eye field III) margin of eye field (quoted in text as "ratio b"),
- ratio of length of eye field to length of anterior (width of eye field I) margin of eye field (quoted in text as "ratio c"),
- ratio of length of tibia IV to length of tibia III (quoted in text as "ratio d").

The above ratios may be quite useful as precise descriptions of the proportions of particular parts of the body of a spider. The variation of ratios, however, as well as the variation of the raw measurements, is surprisingly large. The variation of measurements among specimens of the same age and sex and belonging to the same species is often greater than the variation between different species within the genus. The ratio of length of tibia IV to length of tibia III has been used by some authors as a generic character within the subfamily *Sitticinae*, but this ratio is variable too, and if accepted would result in separation of some otherwise closely related species to different genera.

Until further research based on larger samples as well as on a larger number of species and genera has been carried out, it is not possible to evaluate the usefulness of biometric methods for the systematics of the *Salticidae*. Such studies, however, are urgently needed.

III. DEFINITION OF THE GENUS AND GENERIC CHARACTERS

Generic definitions are usually based on one or a few characters considered to be the common and exclusive property of the whole genus and as relatively unvariable. The early definitions of the genus *Yllenus* SIMON, 1868 were made in this way. After study of all available material the author has failed to find such unvariable generic characters. Thus the author has decided to use a number of characters which are quite variable and are not confined exclusively to *Yllenus* SIM., but when taken together, these characters do seem to define the genus fairly clearly.

The most important characters are supplied by the structure of the copulatory organs of both sexes. The male copulatory organs vary greatly within the genus. There are three basic types of structure according to which the whole genus should be divided into three distinct groups. The particular species characteristic of these groups are so different from one another that they could be regarded as belonging to separate genera were it not for the existence of intermediate forms between them. The structure of the copulatory organs in females also varies within the genus and support the division of the genus into three groups of species. But in the females too there are forms intermediate between the groups. Therefore the author has decided to divide the genus into three groups of species, the *hamifer* group, the *albocinctus* group and the *arenarius* group, but without conferring any definite systematic rank to them. The variability of copulatory organs in males is demonstrated in figs. 2-10 and 11-16, that in females in figs. 45-56 and 57-71. The description of these groups is given later on in this paper.

All species assigned to the genus *Yllenus* SIM. have a characteristic protuberance on the ventral surface of the pedipalpal femur in males. It is located near the basal end of the joint and may be either rounded or conical, upright or inclined or, sometimes, it may be reduced to a sclerotized ridge protruding over and along the surface of the joint. The shapes of these protuberances are given in figs. 32-44.

No *Yllenus* species possess a sclerotized tooth on the posterior inner margin of the chelicerae. This is typical for the whole subfamily, but absence of the tooth does allow *Yllenus* to be separated from some other genera having rather similar copulatory organs but assigned by previous authors to different subfamilies.

There is a sclerotized ridge along the anterior inner margin of the chelicerae. Sometimes it ends with a tooth of variable size protruding above the bent upper part of the margin of the chelicerae. This tooth was regarded by SIMON as a significant character but it may or may not occur in closely related species; there is no correlation in the occurrence of this tooth with any other character, and consequently it cannot be regarded as a character of any generic value.

All investigated species of *Yllenus* SIM. have a scopula — a brush of setae beyond the tarsal claws expanded onto the ventral surface of the tarsus. These occur on tarsi I and II (figs. 76, 77). On the other tarsi there are ordinary clusters of setae, not expanded onto the ventral surface of the joint. Scopulae occur in many genera but their presence in addition to the presence of other characters seems to be helpful in identification. The density and length of the scopula is variable, the length of setae from which it is formed seems to change during the life span of a particular individual. In some specimens investigated the scopula seems to be worn.

The tarsal claws on tarsi I and II are generally robust while those on tarsi III and IV are rather slender and elongated. On the posterior edge of the claws there may be some small teeth but their occurrence seems to be irregular.

All species examined are characterised by the presence of peculiar scale-like setae, called simply "scales" in the latter parts of this paper. They may form the almost exclusive covering of the body, or they may be intermixed with ordinary setae, but they are always present in large numbers on the cephalothorax (especially on the eye field), abdomen and often on the legs.

Summing up, the genus *Yllenus* SIM. may be defined by the simultaneous presence of its characteristic types of copulatory organs, as described below, in males and females; the presence of a characteristic protuberance on the ventral surface of the femur of the pedipalps in males; the presence of a considerable number of scales; the presence of scopulae on tarsi I and II; and the absence of a tooth on the posterior inner margin of the chelicerae. The details of these characters are described in the latter parts of this paper.

The difficulty with these characters is that no one of them, taken on its own, is confined to *Yllenus* SIM. Similar types of copulatory organs occur among some Asiatic species of some other genera. The protuberance on the femur of the pedipalps occurs in some species of *Aelurillus* SIMON, 1884, and in a somewhat different form in some other genera. The presence of scales and of scopulae is a feature of many genera of *Salticidae*, and the absence of a tooth on the posterior inner margin of the chelicerae is characteristic for the whole subfamily. But, as has been stressed earlier, the simultaneous utilisation of several characters does permit the separation of *Yllenus* species from related genera.

Such an arbitrary separation leaves unanswered a number of questions concerning the relative value of particular characters. If the presence or absence of a single tooth on the chelicerae compels separation of species with very similar copulatory organs to different subfamilies, then there arises the question as to whether the value of the cheliceral tooth has not been overestimated. This kind of question cannot be answered in the present state of our knowledge of the systematics of the *Salticidae*. SIMON'S classification of the *Salticidae* is based among other characters on the presence or absence, and the shape of the cheliceral teeth. This character has been used for the separation of three

groups of subfamilies (*Unidentati*, *Pluridentati*, *Fissidentati*) and for the separation of several subfamilies among them. As a result, the probably related genera *Aelurillus* SIMON, 1884, *Pellenes* SIMON, 1876 and *Pseudomogrus* SIMON, 1937 have been assigned to the subfamily *Pelleninae*, while *Philaeus* THORELL, 1869 belongs to *Hyllinae* and *Yllenus* SIMON, 1868, as well as *Attulus* SIMON, 1889, represent the subfamily *Sitticinae* (SIMON, 1899, 1937). This separation of the genera seems to be dubious but the resolution of it will need further research. As a first step in this direction, the author has decided in the present paper that both species of *Pseudomogrus* SIM.¹ as well as several of *Attulus* SIM. do not differ significantly from *Yllenus* SIM. and should be placed in the latter genus. It must be stressed, however, that all these species transferred in this paper to the genus *Yllenus* SIM. had previously been either described or placed in this same genus, but later erroneously removed by SIMON himself.

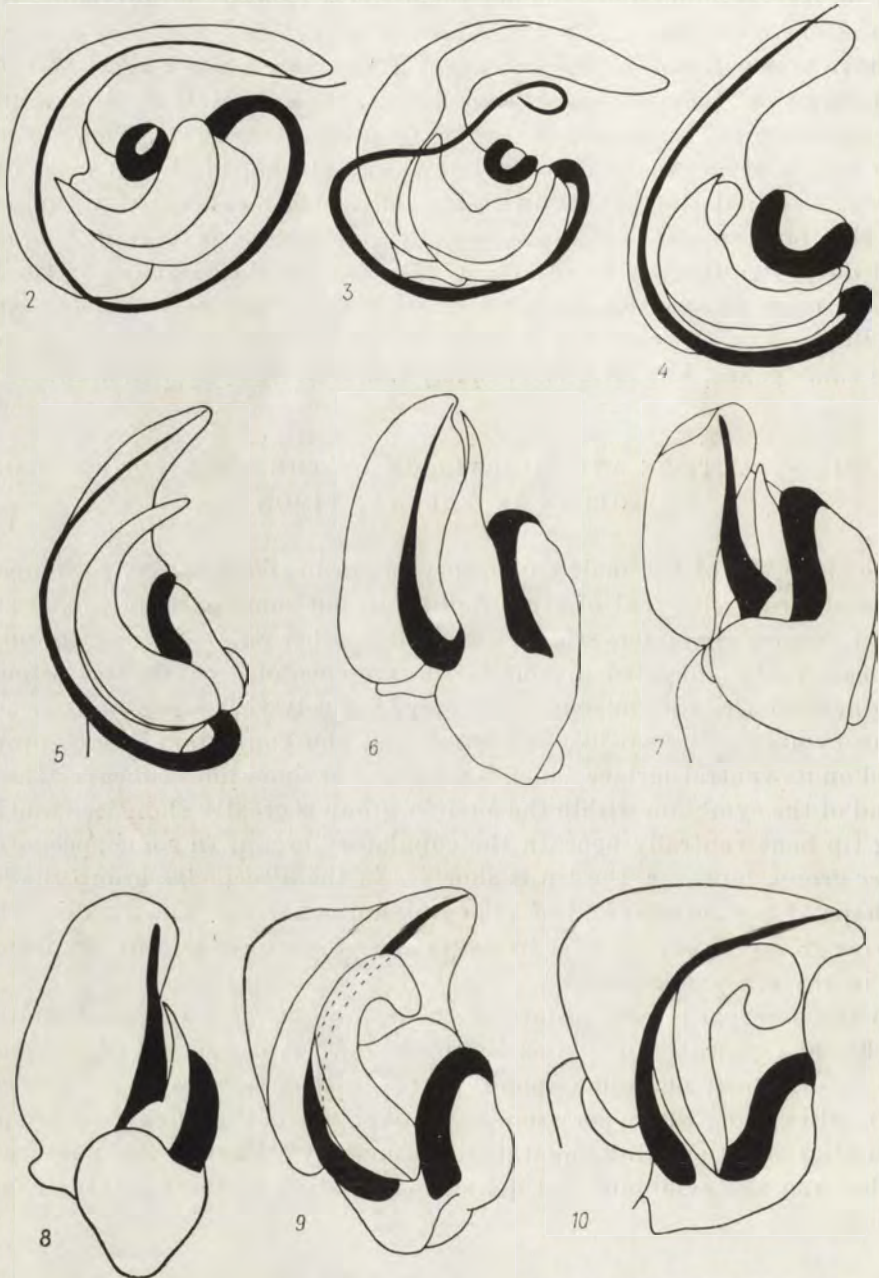
IV. THE STRUCTURE AND COMPARISON OF THE MALE COPULATORY ORGAN IN *YLLENUS* SIMON

The structure of the male copulatory organ in *Yllenus* SIM. is comparable in general terms with that of other *Salticidae*, but some parts of this organ are unusual. Among characters seldom observed in other *Salticidae* one can mention the considerably elongated cymbium, the presence of a conductor (often very strong and robust) and, in some species, a relatively very small bulbus.

The cymbium is boat-like in shape, and the copulatory organ proper is located on its ventral surface which is flattened or sometimes concave. The anterior end of the cymbium within the *hamifer* group is greatly elongated and forms a long tip bent ventrally beneath the copulatory organ. In some species of the *hamifer* group, however, the tip is shorter. In the *albocinctus* group the length and shape of the anterior end of the cymbium is normal. The cymbium in the *arenarius* group is very peculiar in shape and proportions and differs from that found in any other *Salticidae*.

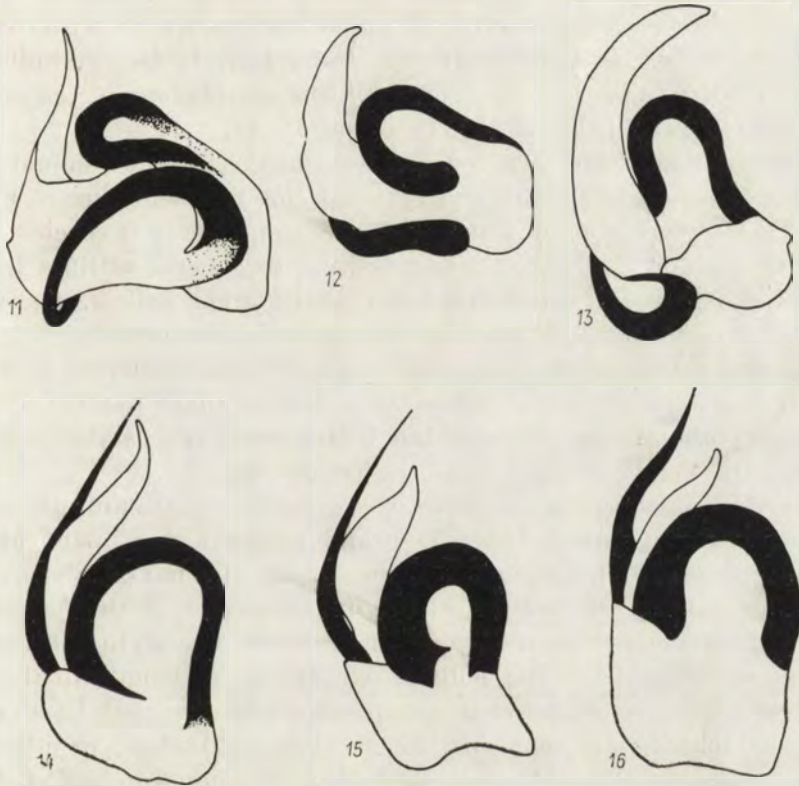
On the external lateral surface of the cymbium, near its basal end, there is a club-like protuberance — as in the majority of species of the *hamifer* group — or a bent plate-like apophysis (as in some species of the *albocinctus* group), articulating with a corresponding apophysis on the tibia. Both apophyses form a kind of articulating apparatus, presumably stiffening the joint between the tibia and the cymbium and delimiting twisting of these joints during copulation.

¹ There is another species described recently as *Pseudomogrus pennatus* DENIS, 1957, whose type is a single poorly preserved female which I have seen in the collection of the Muséum National d'Histoire Naturelle in Paris. It has nothing in common with either *Pseudomogrus* species, and its classification into the genus *Pseudomogrus* SIMON, 1937 is clearly not justified.



Figs. 2-10. Comparison of the copulatory organs of male *Yllenus*, lateral view: 2 - *Y. hamifer* SIM., 3 - *Y. bajan* sp. n., 4 - *Y. baltistanus* CAP., 5 - *Y. mongolicus* sp. n., 6 - *Y. squamifer* (SIM.), 7 - *Y. univittatus* (SIM.), 8 - *Y. saliens* O. P. C., 9 - *Y. arenarius* MENGE, 10 - *Y. horvathi* CHYZ.

The basal part of the copulatory organ, the bulbus, is a sac-like structure containing a broad canal with a sclerotized wall, coiled into a characteristic loop which is clearly visible through the semitransparent wall of the bulbus. The canal, which carries the sperm, passes into the narrow ejaculatory canal entering the elongated stylus and opening inconspicuously at its tip. Alongside the stylus there is a process called the conductor — strong and robust in the *hamifer* and *arenarius* groups, reduced and slender in the *albocinctus* group. There is some correlation between decreasing size of the conductor and increasing size of the bulbus within the genus *Yllenus* SIM.



Figs. 11–16. Comparison of the copulatory organs of male *Yllenus*, ventral view: 11 — *Y. bajan* sp. n., 12 — *Y. balistanus* CAP., 13 — *Y. mongolicus* sp. n., 14 — *Y. squamifer* (SIM.) 15 — *Y. salsicola* (SIM.), 16 — *Y. univittatus* (SIM.).

The tibia of the pedipalps is short and armoured on its external lateral surface, at the apical end, with special articulating, sclerotized structures. The most conspicuous of these is a large hook-like apophysis. In some species the margin of the tibia ventral to the apophysis is also sclerotized and forms a concave articulating depression beyond which there may be an additional sclerotized process.

The patella is also short and, in the *hamifer* group, triangular when seen from the side. Its dorsal surface is long and bent, the ventral surface is very short. In other groups this difference in length of the dorsal and ventral surface is less marked.

The long and massive femur is bent ventrally in the majority of species. On its ventral surface, near its basal end, there is a characteristic protuberance.

There is much variation in the structure of the male copulatory organ among the species of the genus, but this variation forms a regular series of morphological changes. Between the species with most strongly elongated cymbium, massive conductor, long stylus and small bulbus and the species with the shortest cymbium and stylus, smallest conductor and relatively largest bulbus, there are all intermediate stages. This variation in the morphology of the male copulatory organ is given in figs. 2–10, 11–16 and 17–31.

At the beginning of this series of morphological changes we should probably put *Yllenus bajan* sp. n. (figs. 3 and 11), and closely resembling it *Y. hamifer* SIM. (fig. 2), *Y. robustior* sp. n. and *Y. coreanus* sp. n. The next species — *Y. balistanus* CAP. (figs. 4 and 12) — is also similar in general outlines but differs in having a less massive conductor and slightly larger bulbus. The cymbium is elongated but is somewhat shorter and rather more massive.

The general outline of the copulatory organ is rather different in *Y. mongolicus* sp. n. (figs. 5 and 13). The conductor here is arranged parallel to the main axis of the cymbium and forms a thin half-crescent. The stylus is relatively short and only slightly longer than the conductor.

The copulatory organs in the *albocinctus* group are quite uniform in general outline and different only in the shape and proportions of particular parts. The bulbus is generally larger and the loops of the internal canals are broader. The posterior part of the bulbus, absent in all species of the *hamifer* group except for *Y. mongolicus* sp. n., is quite large here. The stylus and conductor are located on the side of the bulbus, parallel to its longitudinal axis and, compared with those in the previous group, are relatively small. In *Y. squamifer* SIM. the conductor is still somewhat longer than the bulbus; in other species, however, it is shorter and in *Y. univittatus* (SIM.) it is equal to half of the length of the bulbus. Simultaneously the length of the stylus gradually decreases and the cymbium in general appearance does not differ from that found in the majority of the *Salticidae* (figs. 6–8 and 13–16).

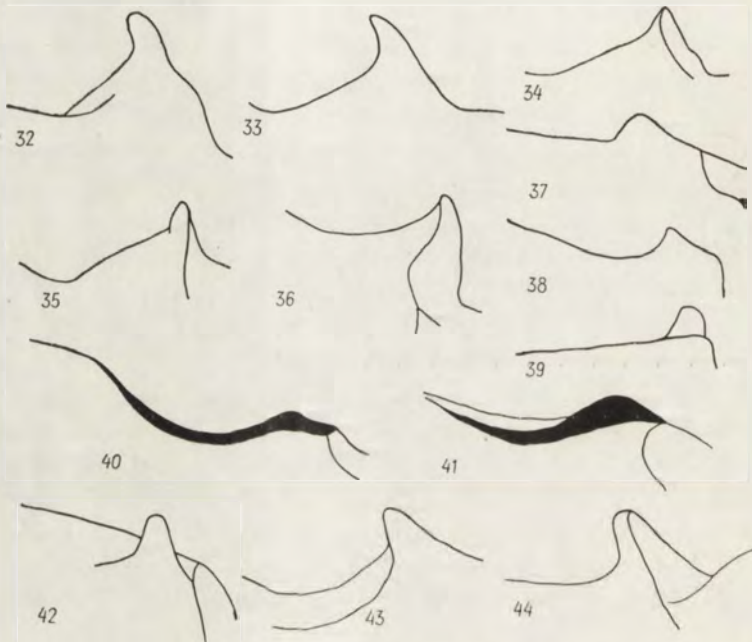
In *Y. arenarius* MENGE and *Y. horvathi* CHYZ., the copulatory organs are somewhat unusual and differ from the morphological series described above. In their general outline, however, there is some resemblance to *Y. mongolicus* sp. n., the most striking being in the proportions of the anterior and posterior parts of the bulbus and also in the size of the conductor. On the other hand the cymbium in the *arenarius* group is greatly broadened and the whole organ is much more massive than in *Y. mongolicus* sp. n. (figs. 9 and 10). We may con-



Figs. 17-31. Comparison of the articulating apparatus of the male pedipalp in *Yllenus* SIM.: 17 - *Y. hamifer* SIM., 18 - *Y. robustior* sp. n., 19 - *Y. coreanus* sp. n., 20 - *Y. bajan* sp. n., 21 - *Y. ballistanus* CAP., 22 - *Y. mongolicus* sp. n., 23 - *Y. squamifer* (SIM.), 24 - *Y. salsicola* (SIM.), 25 - *Y. albocinctus* (KRON.), 26 - *Y. saliens* O. P. C., 27 - *Y. vittatus* THOR., 28 - *Y. validus* (SIM.), 29 - *Y. arenarius* MENGE, 30 - *Y. horvathi* CHYZ., 31 - *Y. univittatus* (SIM.).

sider the *arenarius* group as a side branch of this morphological series; it is comparable in basic outline, but different in details.

A useful systematic character is furnished by the articulating apparatus on the tibia and cymbium of the male pedipalp (figs. 17–31). The function of the “articulating” apparatus in the *hamifer* group is not completely clear. There is a large hook-like apophysis on the tibia in close proximity to a club-like protuberance on the cymbium, but it is not certain whether they actually articulate (figs. 17–21). In the *albocinctus* group, however, the structure of the articulating apparatus seems to demonstrate its function. It consists of a sclerotized hook-like apophysis on the tibia and a flat or curved plate with sharp edges stretching off from the cymbium. A review of this apparatus within the *albocinctus* groups is given in figs. 23–28 and 31.



Figs. 32–44. Comparison of the protuberance on the palpal femur in male *Yllenus*: 32 — *Y. hamifer* SIM., 33 — *Y. robustior* sp. n., 34 — *Y. coreanus* sp. n., 35 — *Y. bajan* sp. n., 36 — *Y. mongolicus* sp. n., 37 — *Y. squamifer* (SIM.), 38 — *Y. albocinctus* (KRON.), 39 — *Y. vittatus* THOR., 40 — *Y. univittatus* (SIM.), 41 — *Y. validus* (SIM.), 42 — *Y. satiens* O. P. C., 43 — *Y. horvathi* CHYZ., 44 — *Y. arenarius* MENGE.

Some transition between the *hamifer* and *albocinctus* groups is supplied by *Y. mongolicus* sp. n. (fig. 22), whose tibial apophysis closely resembles that of *Y. squamifer* (SIM.) (fig. 23) and *Y. univittatus* (SIM.) (fig. 31) of the *albocinctus* group. *Y. mongolicus* sp. n., however, has no distinct apophysis (or protuberance) on the cymbium.

The tibia of *Y. arenarius* MENGE is armoured with an enormous apophysis corresponding with a large fold on the cymbium. The posterior edge of the lateral external surface of the tibia is sclerotized and probably articulates with the corresponding sclerotized edge of the cymbium (fig. 29). Similar structures, but less massive occur in *Y. horvathi* CHYZ. (fig. 30). The variability in shape of the protuberance on the pedipalp femur (figs. 32–44) is of some taxonomic use but its function is not understood.

V. THE STRUCTURE AND COMPARISON OF THE FEMALE COPULATORY ORGAN IN *YLLENUS* SIMON

The copulatory organ of females in *Yllenus* SIM., just as in the majority of other spiders, consists of a modified portion of the ventral surface of the abdomen where the strongly sclerotized distal end of the uterus — the vagina — opens. On both sides of the vagina there are copulatory openings from which more or less sclerotized copulatory canals lead to a pair of sclerotized vesicles, the spermathecae. The shape of the spermatheca varies considerably within the genus, but it is presumed to be quite constant within any one species. The wall of the spermatheca is perforated by the opening of an accessory gland of unknown function; this opening is often surrounded by complicated sclerotized structures, but normally it is quite distinct.

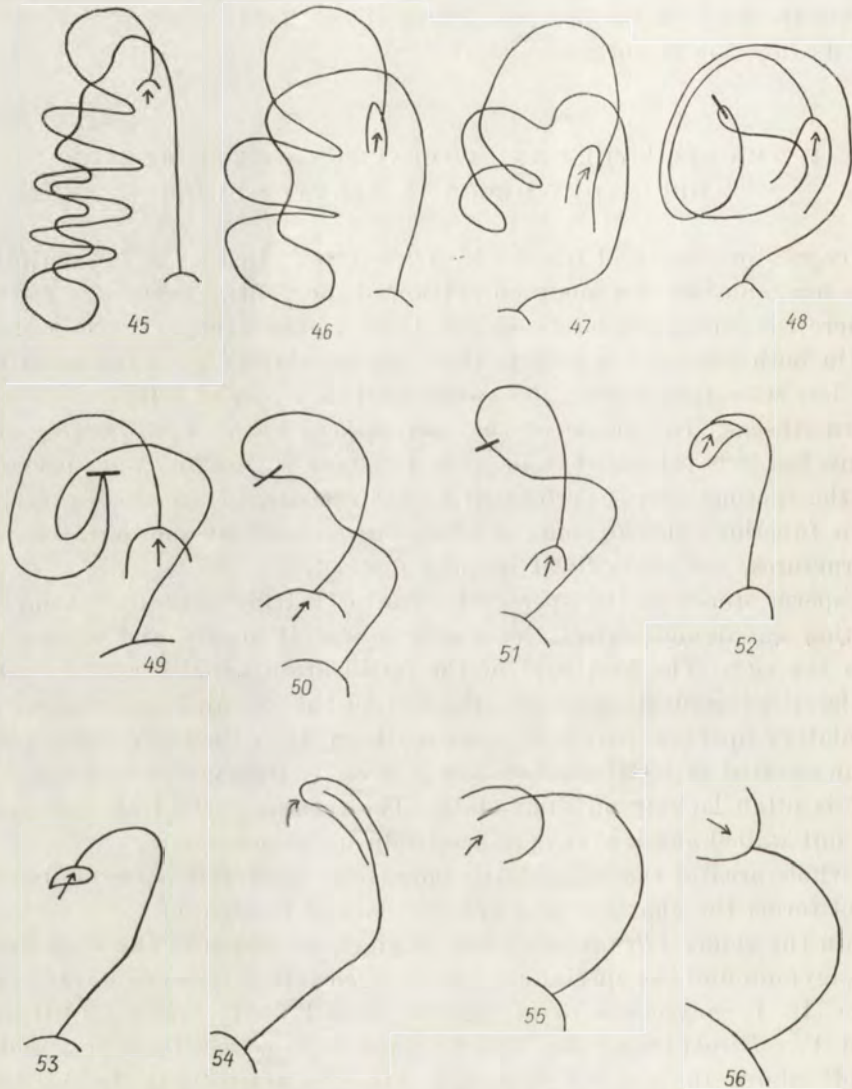
The sperm stored in the spermatheca after mating leaves it through the fertilization canal and enters the uterus where it meets and subsequently fertilizes the eggs. The first part of the fertilization canal forms a characteristic sclerotized conical structure attached to the distal, that is distal from the copulatory opening, part of the spermatheca. It is clearly visible in preparations macerated in KOH-solution but it is easily damaged or even lost, and hence it is often lacking on some slides. The second part of the fertilization canal is soft walled and is always damaged during maceration.

The whole area of the vaginal and copulatory openings is normally sclerotized and forms the characteristic genital plate or epigynum.

Within the genus *Yllenus* SIM. there is much variation in the sclerotization of the epigynum and the species can be arranged into a series according to this character. In *Y. mongolicus* sp. n. (figs. 115 and 116) *Y. squamifer* (SIM.) (fig. 133) and *Y. salsicola* (SIM.) (fig. 124) the epigynum is relatively soft and only the "roof" above the vaginal opening is strongly sclerotized. In *Y. hamifer* SIM. (fig. 81) and *Y. robustior* sp. n. (fig. 87) as well as in *Y. bajan* sp. n. (fig. 95) the sclerotized area is expanded over the whole vagina. In more advanced stages such as are found in *Y. vittatus* THOR. (fig. 159) and *Y. univittatus* (SIM.) (fig. 149), the margins of the copulatory openings also become sclerotized. The completely sclerotized epigynum can be seen in *Y. flavociliatus* SIM. (fig. 168) and *Y. horvathi* CHYZ. (figs. 172–174). In spite of these differences in scleroti-

zation, all of the above mentioned species have a similar basic plan of the epigynum, with the vaginal and copulatory openings in similar positions.

The plan of the epigynum in the case of *Y. arenarius* MENGE is somewhat different (fig. 182). The central part of the epigynum is strongly developed



Figs. 45-56. Comparison of the copulatory canals in female *Yllenus* (diagramatized — line indicates median axis of the canal, arrow — copulatory opening, broad arch — spermatheca, thick transverse line — occurrence of the passage of a thick walled sclerotized canal into a thin walled soft canal): 45 — *Y. hamifer* SIM., 46 — *Y. bator* sp. n., 47 — *Y. ballistanus* CAP., 48 — *Y. mongolicus* sp. n., 49 — *Y. salsicola* (SIM.), 50 — *Y. albifrons* (LUC.), 51 — *Y. squamifer* (SIM.), 52 — *Y. albocinctus* (KRON.), 53 — *Y. univittatus* (SIM.), 54 — *Y. vittatus* THOR., 55 — *Y. horvathi* CHYZ., 56 — *Y. arenarius* MENGE.

and lifted in the form of a convex protuberance. Because of this, the vaginal roof is pushed backwards and twisted under the central part of the epigynum. As a result the roof and the opening can be seen only from the rear when the epigynum is lifted diagonally upwards. This arrangement of the vaginal opening under the posterior margin of the epigynum is unique in *Yllenus* SIM., but does occur in many other genera of the *Salticidae*, for instance in *Sitticus* SIM. Thus, we may visualise the evolution of the epigynum from the soft-skinned area of the surface of the abdomen with two copulatory openings and a single vaginal opening, through several intermediate stages of sclerotization, to a single sclerotized plate with all three openings still on the surface, and then finally the posterior part of the epigynum becoming twisted with the vaginal opening coming to lie under the rest of epigynum. It is probably premature to accept this hypothesis as a satisfactory explanation of the evolution of the epigynum in the *Salticidae*, but it does form a useful working hypothesis to be proved or disproved by further research.

The variation in the copulatory canals of *Yllenus* SIM. forms an interesting series. The simplest ones are found in *Y. albocinctus* (KRON.) (fig. 52) — relatively short and straight but strongly sclerotized. The most complex are soft-walled and spirally coiled as in *Y. hamifer* SIM. and some other related species. The majority of species in the *albocinctus* group, as well as in the *arenarius* group, have canals similar to *Y. albocinctus* (KRON.) and they differ mainly in the degree of sclerotization. Their diagrams are given in figs. 53–56, and detailed drawings under the descriptions of the particular species.

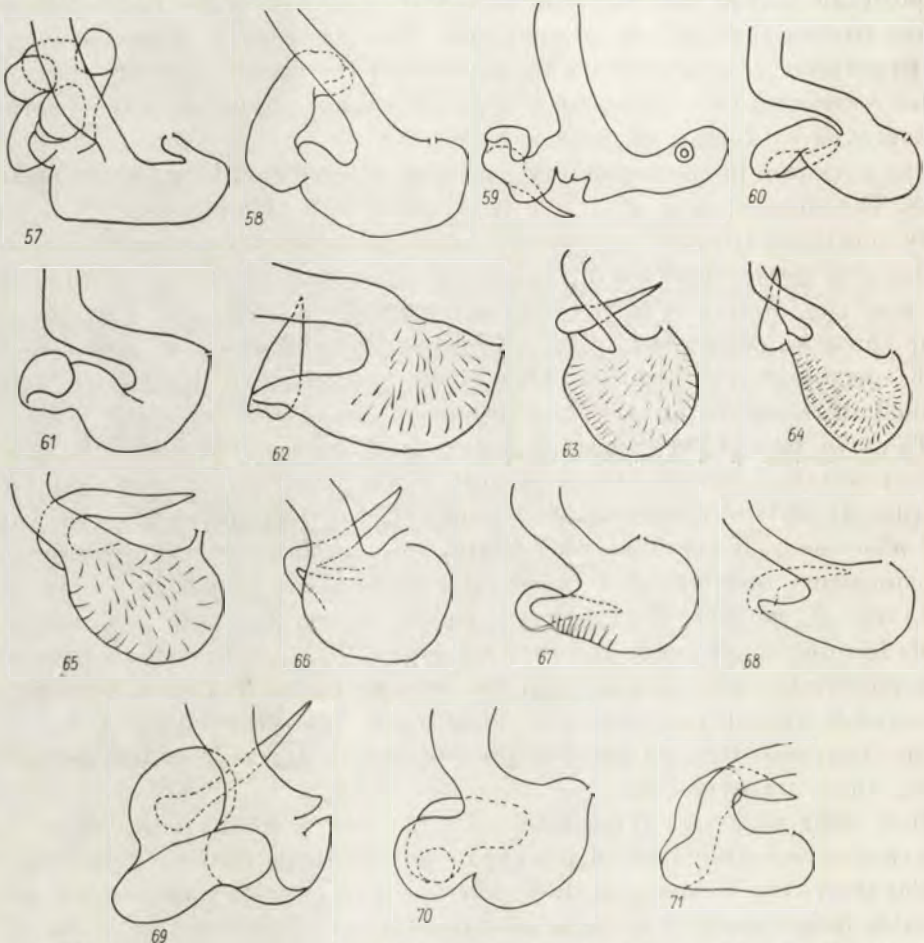
The structure of the copulatory canals in *Y. squamifer* (SIM.) and *Y. albifrons* (LUC.) (figs. 50 and 51) seems to be of particular importance. The posterior (distal) parts of the canals are strongly sclerotized and resemble the canals in *Y. albocinctus* (KRON.) and other related species. However, in the place where the copulatory openings of *Y. albocinctus* (KRON.) are found, in *Y. squamifer* (SIM.) and *Y. albifrons* (LUC.) the sclerotized canals pass into less sclerotized canals forming single loops, and the true copulatory openings are located much more posteriorly. The passage from the stronger to the less sclerotized part of the canal is abrupt and there is a sharp border-line between them (fig. 135). In the diagrams (figs. 50 and 51) the position of this border-line is marked with a thick transverse line.

It is clear that this thin-walled loop has been added on to the original thick-walled and straight canal, but the reasons for this arrangement are obscure. Similar traces can be detected in *Y. salsicola* (SIM.), which however, has added a double loop instead of a single one (fig. 49) and *Y. mongolicus* sp. n. where the added loops are even more complicated (fig. 48).

It is also interesting that on the surface of the epigynum in *Y. salsicola* (SIM.) (fig. 124), just above the point of fusion of the canals, there is a round stronger sclerotized plate, concave in the centre and resembling quite closely the sclerotized copulatory opening area in *Y. albocinctus* (KRON.) and in some

other species. Even the location is similar, but these plates are not perforated, have no connection with the copulatory canals, and the true copulatory openings are located much more posteriorly.

In the *Y. baltistanus* CAP. there is no trace of such a border-line between the sclerotized and the soft-walled canal. The passage is smooth without any traces of an additional part, the canal itself forms a complicated entangled knot of several loops (fig. 47). In *Y. bator* sp. n. (fig. 46) the canal is coiled into a double spiral (one inside the other). The canals in *Y. hamifer* SIM. (fig. 45) and *Y. robustior* sp. n. form similar spirals, but with a larger number of coils and they form the most complicated pattern within the whole genus.



Figs. 57-71. Comparison of the spermathecae in female *Yllenus*: 57 - *Y. hamifer* SIM., 58 - *Y. robustior* sp. n., 59 - *Y. bator* sp. n., 60 - *Y. bajan* sp. n., 61 - *Y. baltistanus* CAP., 62 - *Y. mongolicus* sp. n., 63 - *Y. squamifer* (SIM.), 64 - *Y. salsicola* (SIM.), 65 - *Y. albifrons* (LUC.), 66 - *Y. albocinctus* (KRON.), 67 - *Y. vittatus* THOR., 68 - *Y. univittatus* (SIM.), 69 - *Y. horvathi* CHYZ. - Bulgarian specimen, 70 - *Y. horvathi* CHYZ. - Hungarian specimen, 71 - *Y. arenarius* MENGE.

The spermathecae among particular species differ in shape, proportions, relief of the internal surface and in the structure and location of the opening of the accessory gland. The simplest ones are in *Y. baltistanus* CAP. (fig. 61) where they resemble swollen parts of the canals. Relatively simple spermathecae occur in *Y. bajan* sp. n. (fig. 60), *Y. albocinctus* (KRON.) (fig. 66) and also in *Y. univittatus* (SIM.) (fig. 68). In *Y. hamifer* SIM. (fig. 57) and in *Y. robustior* sp. n. (fig. 58) the distal part of the spermatheca is bigger and quite complicated. The same part is similarly large in *Y. bator* sp. n. (fig. 59), but in that species the anterior part of the spermathecae is enlarged too. Both *Y. arenarius* MENGE (fig. 71) and *Y. horvathi* CHYZ. (figs. 69 and 70) have the anterior parts of the spermatheca strongly developed but their structure is somewhat different from the previously described species.

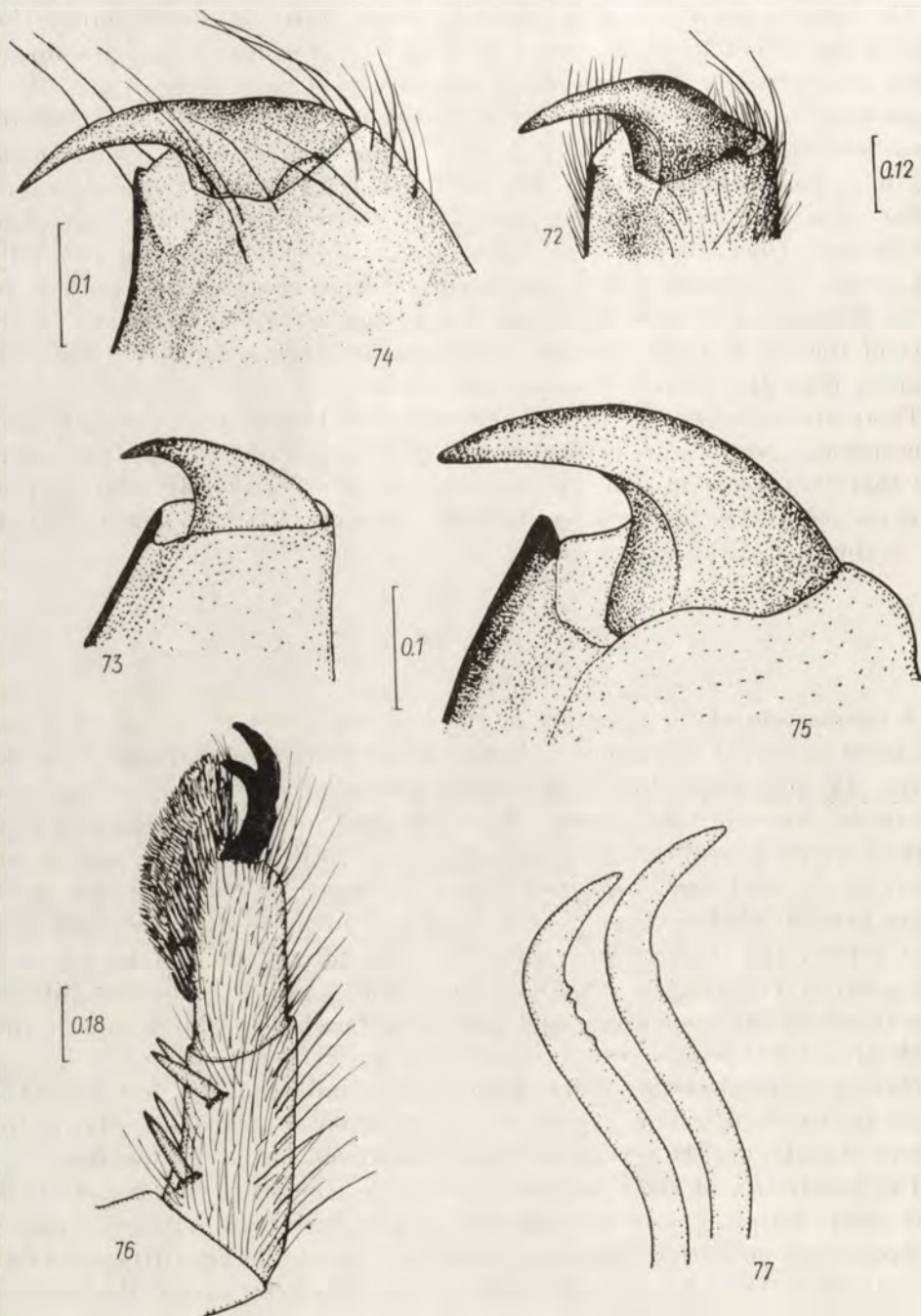
There are sclerotized teeth on the internal surface of the spermathecae in some species, and these are marked on the diagrams in figs. 57–71. It is interesting that they occur in some species, while other very closely related species have no teeth. The material studied was, however, insufficient to attempt any evaluation of this character.

*
* *

A comparison of the structure of the female copulatory organs in *Yllenus* SIM. leads to similar conclusions as can be drawn from a comparison of the male organs. In both cases there are similar trends of morphological variation. *Y. hamifer* SIM. and some closely related species can be put at one end of the chain of morphological variation, the next come *Y. baltistanus* CAP. and *Y. mongolicus* sp. n., next are *Y. salsicola* (SIM.), *Y. squamifer* (SIM.), *Y. albocinctus* (KRON.) and *Y. albifrons* (LUC.). Near the other end of the chain there are *Y. vittatus* THOR., and *Y. univittatus* SIM. The structure of the genital organs in both sexes in *Y. horvathi* CHYZ. and *Y. arenarius* MENGE is somewhat different from those on the main chain and they may be classified as a side branch, which are probably most closely related to *Y. mongolicus* sp. n.

Having established this series of forms, it is unfortunately not possible to decide in which direction evolution has occurred. Conclusions drawn from a study of males are the reverse to those drawn from a study of females.

The peculiarity of the structure of the male copulatory organs in the *hamifer* group, with its enormous conductor, long stylus, small bulbus and massive but apparently primitive cymbium, seems to suggest the primitiveness of this type of organ. There is a gradual change from this type within the genus involving a decrease of the length and volume of the conductor, with a simultaneous increase in the size of the bulbs. At the end of the series, the size of the bulbus comes to resemble its size in typical *Salticidae*. All these changes suggest simplification during evolution.



Figs. 72-77. Chelicerae and tarsal claws in *Yllenus* SIM. Chelicerae: 72 - *Y. coreanus* sp. n., 73 - *Y. saliens* O. P. C. (note absence of tooth), 74 - *Y. albifrons* (LUC.) (small tooth present), 75 - *Y. vittatus* THOR. (large tooth present). *Y. coreanus* sp. n.: 76 - scopula on tarsus I, 77 - claws on tarsus IV.

Evidence of an addition to the loop in the copulatory canals of females in some species indicates the opposite direction of evolution — gradual complication of the structure of the genital organs within the chain of species. The most primitive type would be the simple organ found in *Y. albocinctus* (KRON.), and by gradual complication of the course of the canals the final most complicated structure would be like that in *Y. hamifer* SIM.

Summing up, the interpretation of the peculiar copulatory organs in the *hamifer* group remain a problem. The assumption of the primitiveness of this group which is so different from the average of the family leads to the very tempting and much broader hypothesis of the primitiveness of the whole genus *Yllenus* SIM. within the *Salticidae*. If this is true, the study of *Yllenus* SIM. and related genera could lead to very interesting and promising results concerning the whole family. The contradictory assumption of the primitiveness of the simple organs in the *albocinctus* group and the evolution through secondary complication of these organs up to the structures found in *Y. hamifer* SIM. limits the importance of the problem to this one genus. This may be perhaps resolved when the detailed study on the structure of the genital organs has covered the majority of genera in the family.

VI. CRITERIA FOR DISTINGUISHING SPECIES WITHIN THE GENUS *YLLENUS* SIMON

Owing to scarcity of material available for study in *Yllenus* SIM. it is not possible at present to evaluate the taxonomic importance of characters. The intraspecific variation of the characters is not known and so their use for classification must remain provisional. The normal practice of inventing systematic keys seems to be rather misleading in the case of such characters. The "key" characters are normally a few typical and invariable features of the species. When the species is known from the study of only a single specimen, or just a few specimens, it is impossible to select "key" characters, and the invention of a key becomes pointless. The species of *Yllenus* SIM. live in poorly studied areas and there are probably a good many new species awaiting discovery. The true extent of intraspecific and intrageneric variation remains unknown, and it is therefore too early to decide which are good specific characters.

Instead of the usual key, then, the author wishes just to give some indication of the characters which enabled him to distinguish particular species — that is to give some rough ideas instead of a premature key.

Starting from *Y. hamifer* SIM. (see description in the next section) as a point of comparison, we can see that the next species, *Y. robustior* sp. n. differs from it in only a few rather small characters. In the male genital organs, the elongated tip of the cymbium is somewhat longer and more slender in *Y. robustior* sp. n. and its bulbus somewhat smaller. The shape of the pedipalpal femoral protuberances and the outlines of the apophyses of the tibia and cymbium are also slightly different in the two species (figs. 17, 18, 32, 33, 78–80, 85, 86).

While the differences between males of *Y. hamifer* SIM. and *Y. robustior* sp. n. are rather slight, the differences between females are much greater. Although the general structure of the female copulatory organs is practically the same, the shape and proportions of the epigynum are different (figs. 81 and 87) especially the position, shape and size of the sclerotized roof over the vagina. The copulatory canals form similar double spirals, but the outline of the coils and their proportions are somewhat different (figs. 82 and 88). The spermathecae differ in their proportions, shape, and also in the shape of the opening of the accessory gland (figs. 83 and 89). Both sexes of *Y. robustior* sp. n. are large and are bigger than any other species in the *hamifer* group.

The male specimens of *Y. coreanus* sp. n. (the female is unknown) differ from *Y. hamifer* SIM. and *Y. robustior* sp. n. in the lack of any colour pattern on the cephalothorax and abdomen. The differences in the structure of the copulatory organ are small and not very striking. The most important differences are the shape of the apophyses of the cymbium and tibia (figs. 17–19) and the shape of the pedipalp femoral protuberance (figs. 32–34).

Both male and female of *Y. bajan* sp. n. differ in size and colouration from the three species mentioned above. The male copulatory organ, although similar in its general pattern, differs in the proportions of the various parts. The apophysis of the cymbium is stronger and shorter (fig. 20); the apophysis of the tibia is also characteristic and the protuberance on the pedipalp femur is bigger (fig. 35).

The female's epigynum differs in shape and the proportions of particular parts (fig. 95). Especially distinct differences lie in the shape of the vaginal roof, the shape and size of the copulatory openings and the shape of the canals visible through the semitransparent epigynum. In the copulatory canals, the number of coils is similar to that found in the previous species, but the shape of the coils and their proportions are somewhat different (fig. 96). The shape and proportions of the spermathecae, especially their distal parts, and also the opening of the accessory gland are quite distinctly different from those found in all previous species (figs. 97 and also 60).

The female of *Y. bator* sp. n. (the male is unknown) differs distinctly from previous species in the shape and proportions of the epigynum (fig. 98), the smaller number of coils in the spirals of the copulatory canals (fig. 99) and also by the shape and structure of the spermathecae (figs. 100 and also 59).

The copulatory organ of the male of *Y. baltistanus* CAP. is quite different from that found in the species described so far. The elongated tip of the cymbium is much shortened and can be regarded as an intermediate form between the long tipped cymbium in the *hamifer* group and the short tipped cymbium normal for the *Salticidae*. Although the general plan of the copulatory organ is similar to the last species, the shape and proportions of the particular parts are quite different. The bulbus is much bigger and its length is comparable with that of the conductor, the stylus is much shortened in comparison with

Y. bajan sp. n. but the apophyses of the cymbium and tibia are quite similar (figs. 101–103 and also 21).

The epigynum of the female of *Y. baltistanus* CAP. differs from that of the species so far described in shape and proportions, especially those of the copulatory openings (fig. 108). The general plan of the epigynum, however, is comparable to that of these species. The copulatory canals form several entangled loops, but they do not form a spiral, as is characteristic of *Y. bator* sp. n. and other related species (figs. 109 and also 47). The spermathecae (figs. 110 and 61) are unique.

Specimens of both sexes of *Y. mongolicus* sp. n. are much smaller than all other species of the *hamifer* group and can be distinguished at first glance by their general colouration and pattern. The male also has a peculiar dense brush of long black spines on tibia I and metatarsus I. The male copulatory organ is intermediate between those of the *hamifer* and *albocinctus* groups and displays simultaneously some analogies to those of the *arenarius* group. The cymbium is only slightly elongated, the bulbus proportionally larger, conductor and stylus much shorter than in *Y. hamifer* SIM. but none-the-less relatively long and massive. The tibial apophysis is well developed and resembles those found in both the *hamifer* and *albocinctus* groups. However, there is no protuberance on the cymbium (figs. 111–114 and 22).

The epigynum of the female of *Y. mongolicus* sp. n. (figs. 115–116) is relatively poorly sclerotized. The loops of the copulatory canals differ greatly from those in *Y. baltistanus* CAP. and resemble to some extent those in some species of the *albocinctus* group (figs. 117 and also 48). The structure of the spermatheca is rather special and its internal surface is armoured with teeth.

The females of *Y. salsicola* (SIM.), *Y. albifrons* (LUC.), *Y. saliens* O. P. C. and *Y. squamifer* (SIM.) have quite similar epigyna. They differ in the position, shape and size of the copulatory openings, in the shape and position of the vaginal roof, and also in the general proportions of all these parts (figs. 124, 126, 133 and 165). The internal structure of their copulatory organs are quite different.

The female of *Y. salsicola* (SIM.) can be distinguished by the double looped copulatory canals (fig. 125), while *Y. albifrons* (LUC.) (fig. 128) and *Y. squamifer* (SIM.) (fig. 134) have single loops. But these single loops in the last two species are not alike, the anterior proximal part of the canal running either under [*Y. albifrons* (LUC.)] or over [*Y. squamifer* (SIM.)] the posterior, distal part. There are differences in the spermathecae too.

The copulatory canals of the female of *Y. saliens* O. P. C. are very like those in *Y. albifrons* (LUC.), though the females can be differentiated by the different shape of the distal parts of the spermathecae, the sizes of the copulatory openings in comparison with the spermathecae, and the anterior parts of the copulatory canals which in *Y. saliens* O. P. C. run under and not over their posterior parts (fig. 166).

I have not seen the male of *Y. albifrons* (LUC.), but the males of *Y. salsicola* (SIM.) and *Y. squamifer* (SIM.) are quite similar. They differ slightly in the proportions of the bulbus, conductor and stylus (figs. 121, 122, 129, 130), and distinct differences are found in the structure of the articulating apparatus (figs. 123, 131).

The copulatory organ of the male *Y. albocinctus* (KRON.) is similar to those in previously described species, but it differs, however, in the proportions of particular parts. One specially distinct difference lies in a shortening of the conductor (figs. 136, 140). In the female, both epigynum and internal parts are very unusual and different from all previous species (figs. 141–143).

The differences among males of *Y. vittatus* THOR., *Y. validus* SIM., *Y. univittatus* (SIM.) and *Y. saliens* O. P. C. lie in the proportions and shape of the particular parts of the copulatory organ. The most distinct differences are supplied by the articulating apparatus (figs. 147, 152, 157, 158, 161) and also by the shapes of the ventral protuberance on the femur of the pedipalps (figs. 39–42).

The differences in epigynum, copulatory canals and spermathecae of females of *Y. vittatus* THOR., and *Y. univittatus* (SIM.) are striking (figs. 149, 150, 159, 160). The specific differences of both sexes of *Y. flavociliatus* SIM., *Y. horvathi* CHYZ. and *Y. arenarius* MENGE are obvious and do not need additional comment.

VII. SYSTEMATIC SURVEY OF SPECIES

Part I. The *hamifer* group

The *hamifer* group contains species characterized in the males by the elongated cymbium and stylus, massive and large conductor, and relatively small bulbus. The articulating apparatus consists of a large tibial apophysis and a protuberance (sometimes absent) on the cymbium. In females, the epigynum is generally poorly sclerotized, whilst the copulatory canals form complicated coils and are also rather poorly sclerotized.

Yllenus hamifer SIMON, 1895

Synonym: *Yllenus hamiger* SIMON, 1899.

Material: "14737. *Yllenus hamiger* E. S. Mongolia Sept. POTAN. [IN]" — 1 ♂, 1 ♀ (syntypes) (coll. E. SIMON, MNHN-Paris); "*Yllenus hamifer* SIM., S. W. Mongolei, Lanchow. VII Sven HEDIN Exp., SÖDERBROM", "2230 a" — det. SCHENKEL — 1 ♀ (NM-Basel). (Identity of this specimen with the species described by SIMON is not completely certain).

The synonymy of this species has been badly confused by SIMON himself, who in the same paper (SIMON, 1899) used both the names "*hamifer*" and "*hamiger*" on consecutive pages. In the posthumous edition of his "Les Arachnides de France" (Vol. 6, part 5, 1937),

the erroneously spelled name of "*humiger*" has been connected unjustly with the name of "*flavociliatus*" as "*Yllenus humiger flavociliatus*". On the original label, SIMON has written the name "*hamiger*" but the name "*hamifer*", used in the first original description, must be considered as the valid specific name.

The original description by SIMON corresponds with the syntype specimens, but the additional remark in that description concerning a lack of the pedipalpal femoral protuberance is entirely wrong. The protuberance is visible only when the femur is seen from one particular angle and apparently it has been overlooked by SIMON. Also the drawing of the male copulatory organ, published in the paper of 1899 (SIMON, 1899, vol. 2, p. 578, figs. 699-704) is wholly inaccurate. The drawings published in the present paper (figs. 78-80) have been drawn from probably the same specimen as those of SIMON, and they give a better indication of the real structure of the organs.

According to a remark in the original description there were a number of specimens in the possession of SIMON; now, however, only two specimens are kept in Paris. My correspondents in Moscow and Leningrad have kindly informed me that in the collections of their Zoological Museums, where some of the material from the POTANIN expedition may be expected to occur, there are no specimens of this species. The fate of the other syntypes remains therefore unknown.

Description of male

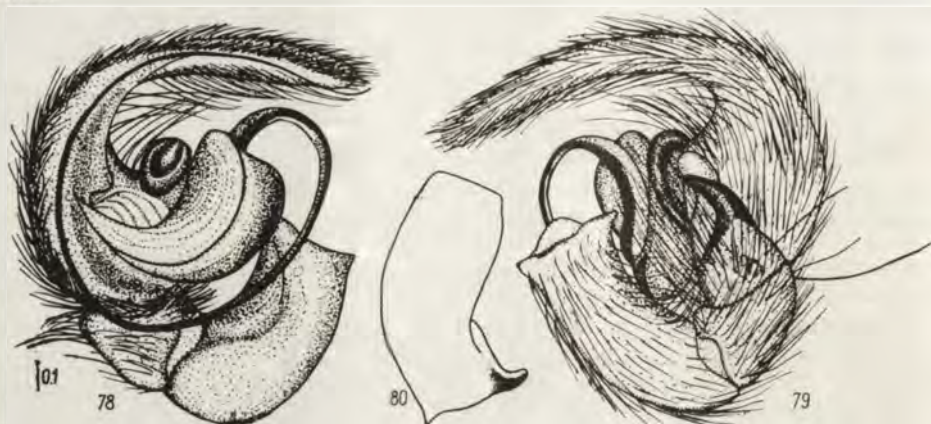
Cephalothorax light brown; near the lateral eyes dark brown. Eye field covered with white scales with a few fawn ones. Fawn scales form two indistinct marks — the anterior one consists of two lines meeting at an angle in the centre of the field; the posterior has the form of a longitudinal line stretching along the mid dorsal line between eyes III. The specimen is faded and on fresh specimens these marks may be much more distinct. Above eyes I there is a row of strong white bristles and a row of even stronger and longer black bristles. Thorax and sides of cephalothorax covered with white elongated scales. On the ventral margin of cephalothorax, white scales are especially large. Below the side margins of the eye field, and on the thorax, there are scattered long brown bristles. Length of cephalothorax 2.38, length of eye field 1.11, width of eye field I 1.44, width of eye field III 1.48. Ratios¹: *a* 0.46, *b* 0.97, *c* 0.77.

Abdomen dorsally greyish-brown with yellowish concave furrows. Covered with white scales with metallic gloss; scales on the mid part of abdomen are somewhat bigger than those on sides. Along the longitudinal mid-line of the abdomen there are two patches (spots) of fawn scales. The posterior part of the abdomen is now bald. The spinnerets are whitish-yellow and surrounded by colourless setae. Length of abdomen 2.31.

Sternum dark brown with a light brown spot on the centre, covered with fine and long white hairs and a few large white scales. Coxae yellow with an

¹ For explanation of ratios *a*, *b*, *c*, *d* see chapter II page 412.

olive shiny gloss and greyish spots, covered with white setae and scales. The scales are numerous, dense and quite distinct on coxae I, but their number gradually diminishes on the next pair of coxae, and on coxae III and IV they are rather scarce and indistinct. Maxillary plates bordered fawnish-white. Labium brownish fawn, bordered with white. Chelicerae brownish fawn, typical.



Figs. 78–80. *Yllenus hamifer* SIM. — ♂, left copulatory organ: 78 — lateral view of inner surface, 79 — lateral view of outer surface, 80 — pedipalpal femur, inner surface.

Pedipalps (fig. 2). Cymbium greatly elongated, its narrow and long tip bends below the ventral surface of the copulatory organ. Dorsal surface of this tip is covered with setae and the lateral surfaces by bristles. Ventral surface is bald and smooth, and forms a kind of bed for the elongated stylus. Bulbus very small, conductor large and massive. When seen from the side, the conductor resembles a thick crescent with elongated upper end. Stylus arises close to the end of the canals of bulbus, near the basal part of the conductor. It forms a full circle around the main mass of the copulatory organ and finally runs on the surface of the bed on the ventral surface of the cymbium's tip, expanding slightly beyond its end (figs. 78, 79). On the external lateral surface of the cymbium there is a club-like protuberance, covered by very long and thin white setae. It articulates probably with the sclerotized apophysis of the tibia. Tibia short, and, when seen from the side, it seems to be only a short base to its great hook-like apophysis (fig. 17). Patella short and triangular in outline when seen from the side. Femur bent ventrally and armoured with a distinct protuberance on its ventral surface near the proximal end (fig. 80).

Legs. Tarsus, metatarsus and tibia I and II — yellowish-fawn. Patella I and II yellow, femur I and II olive-grey with yellowish dorsal surface and large oval yellow spots on the lateral surface. On the lateral surface of tibia and patella I, there are irregular large grey spots. Legs III yellow with a slight olive shade, lateral surface of tibiae and femora III and IV olive-grey. All legs

covered with white scales and setae, together with a few brown setae. Spines present. Claws typical. Scopulae and tarsal tufts typical. Length of segments of legs: I $0.72 + 0.66 + 0.93 + 1.02 + 1.40$, II $0.66 + 0.42 + 0.84 + 0.90 + 1.30$, III $0.90 + 0.87 + 0.87 + 0.96 + 1.71$, IV $0.84 + 1.14 + 1.30 + 1.26 + 2.52$. Ratio d 1.5.

Description of female

Cephalothorax brown with blackish-brown surrounding of lateral eyes. Eye field covered with white scales with a few additional light fawn scales arranged in two indistinct triangular streaks in the anterior part of the field. Above eyes I there is a row of strong white bristles and a further row of brown bristles. Similar large brown bristles are scattered sparsely on the surface of the eye field, and are concentrated below the lateral eyes and behind the posterior eyes. Length of cephalothorax 2.80 (2.52)¹, length of eye field 1.26 (1.17), width of eye field I 1.71 (1.71), width of eye field III 1.76 (1.89). Ratios: a 0.45 (0.46), b 0.97 (0.90), c 0.73 (0.68).

Thorax and lateral surfaces of the cephalothorax covered with white, elongated scales. They are somewhat more sparse and less intensely white near the longitudinal median line of the thorax, but there is no distinct dark belt. Ventral margin of the cephalothorax covered with large and intensely white scales.

Abdomen dorsally yellow-grey, covered with white scales between which the colour of the abdomen is distinctly seen. There are four spots of reddish-fawn scales along the mid-longitudinal line of the abdomen. Single fawn scales scattered over the whole surface of the abdomen do not influence its general colouration; on the sides, however, they form the indistinct fawn spots. Spinnerets yellow, covered with long reddish-fawn setae. Anal protuberance covered with large white scales. Abdomen ventrally yellowish white, covered with white scales and setae. Length of abdomen 3.91 (lacks).

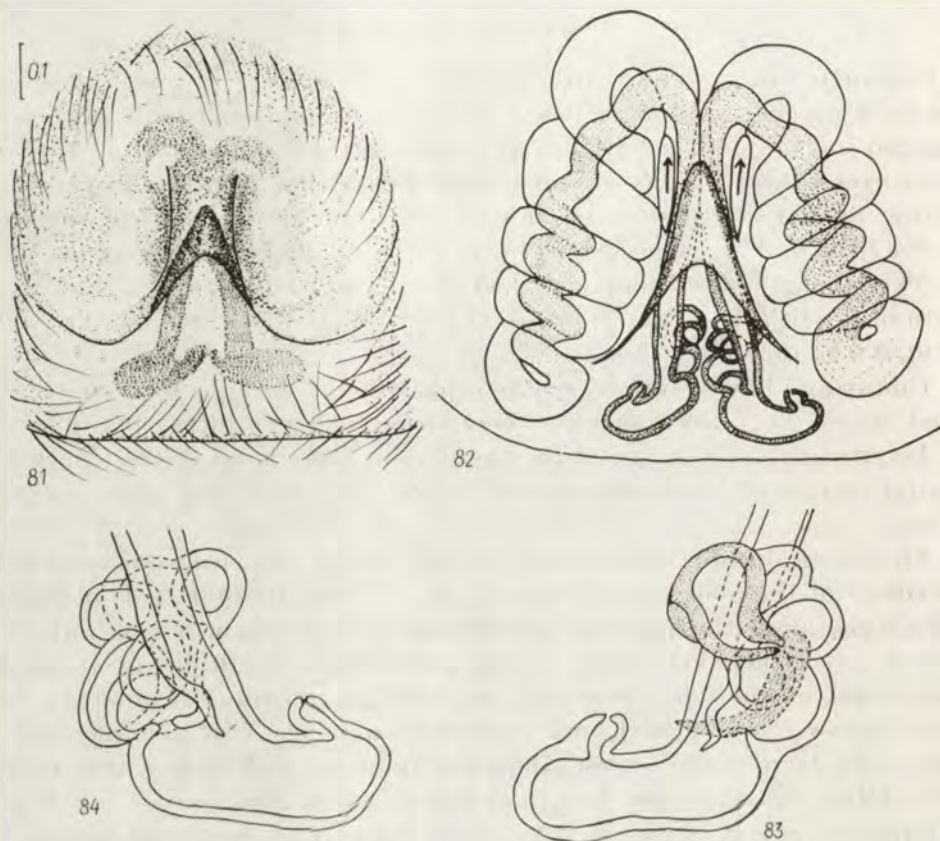
Epigynum (fig. 81) poorly sclerotized, the only distinctly sclerotized part is the roof over the vagina. Copulatory openings, narrow and slit-like, are visible only after maceration in KOH and are located at the bottom of grooves on both sides of the elevated ridge. The posterior margin of the vaginal roof is deeply procurved (fig. 82). The canals and spermathecae are visible through the semi-transparent wall of the epigynum.

Copulatory canals (fig. 45) form double spirals with 5 external coils and 5 or 6 (depending on the method of counting) internal ones. The anterior part of the internal spiral is loosened and passes later into a straight canal leading to the spermatheca. With the single exception of this posterior straight part of the canals are thin-walled, poorly sclerotized and wrinkled. Posterior parts

¹ Figures without parentheses — measurements of the syntype specimen, figures in parentheses — measurements of the Lanchow specimen.

of canals extend far beyond the procurved margin of the vaginal roof — this is a very distinctive character of the species.

The spermathecae have an elongated anterior part and elongated and coiled distal part. Opening of the accessory gland is distinct (figs. 57, 83, 84).



Figs. 81–84. *Yllenus hamifer* SIM. — ♀, copulatory organs: 81 — epigynum, 82 — epigynum after maceration, 83 — spermatheca, ventral view, 84 — the same, dorsal view.

Sternum yellow-fawn with grey-brown bordering and steel-grey margin, covered with long and fine white hairs. Coxae whitish-yellow, covered with white setae. On coxa I there are also white scales. At the centre of every coxa and also in the anterior part of the sternum there is a single large brown bristle. Maxillary plates and labium fawn with white spot at their tips. Chelicerae dark brown, typical.

Legs. All joints of the first leg and also patellae II–IV yellow; all remaining joints yellow-fawn. On the posterior surface of femora II–IV there is a grey triangular spot located in the distal dorsal angle of the joint. Legs covered with

white scales and setae and sparsely with brown bristles. On the first three joints of legs I and II, there are additional quite dense short brown setae. Spines present. Scopulae on I and II, and tarsal tufts on III and IV — typical. Claws typical without distinct teeth. Length of segments of legs: I $0.87 + 0.63 + 0.84 + 1.08 + 1.53$ (? $+ 0.72 + 1.08 + 1.08 + 1.53$), II $0.81 + 0.63 + 0.72 + 1.08 + 1.30$ (? $+ 0.72 + 0.84 + 0.90 + 1.44$), III $0.90 + 0.87 + 0.87 + 0.96 + 1.71$ (? $+ 0.84 + 0.81 + 0.81 + 1.53$). IV $0.84 + 1.14 + 1.30 + 1.26 + 2.52$ (? $+ 1.08 + 1.35 + 1.17 + 2.24$). Ratio d 1.5 (1.67).

Specimen from Lanchow, described by SCHENKEL, 1937. As it was a single specimen in the collection in Basel I have not made a preparation of the epigynum and details of the copulatory canals and spermathecae are unknown. The epigynum is approximately similar to that in *Y. hamifer* SIM., but there are also certain differences. The final classification of this species must be deferred until further material becomes available.

Yllenus robustior sp. n.

Material: "*Yllenus robustior*, ♂ Prz. 3 [China, Sinkiang prov., Khotan River, somewhere between Khotan and the confluence with Tarim River, leg. M. PRZEWAŁSKI], ♀ Prz. 6 [China, Sinkiang prov., Lake Lop-Nor and on the road from the Lake Lop-Nor to Vash Shahri upon the Charchan River, leg. M. PRZEWAŁSKI]" — ♂ holotype, ♀ allotype, 3 ♀♀ paratypes (I. Z. PAN-Warszawa).

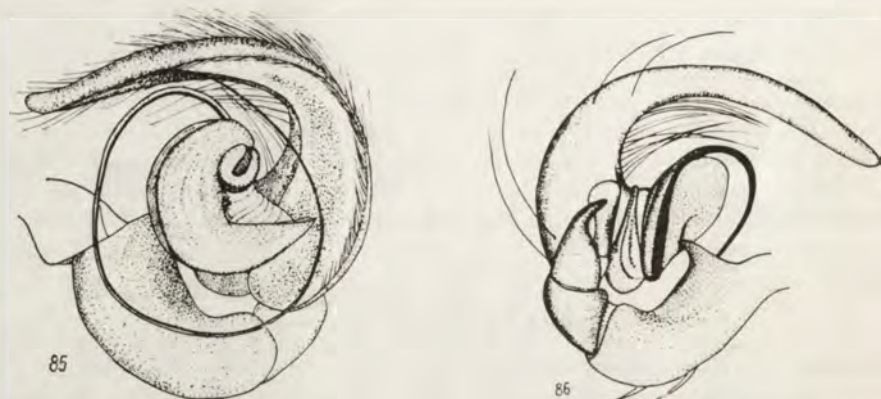
These specimens have been discovered in an old collection of spiders of W. KULCZYŃSKI, who distinguished the species and labelled it with a specific name "*robustior*", but failed to publish the description.

Description of male

Cephalothorax brown, surrounding of eyes III black. Eye field covered with white scales together with a few brown ones forming two triangular, backward pointed spots in the anterior part of the field. The third spot, also triangular, is located between eyes III. These spots are indistinct and have some white scales intermixed with brown ones. Single brown scales are scattered over the whole eye field. Between the anterior spot and eyes I there is a streak of more intensely white scales. Above eyes I there is a row of long stout brown bristles. Thorax covered sparsely with elongated and slightly flame-like undulated white scales with a steel tint. Ventral margin of the cephalothorax covered with white scales, less distinct, however, than in the previous species. Length of cephalothorax 3.22, length of eye field 1.39, width of eye field I 1.82, width of eye field III 1.82. Ratios: a 0.43, b 1.00, c 0.76.

Abdomen dorsally brown with gold transverse stripes in posterior part. Covered with white scales; along the mid-longitudinal line there is a broad belt of brown scales intermixed with white ones. Sides of abdomen white. Spinnerets yellow-fawn. Abdomen ventrally yellowish-greyish-white, covered with distinct white scales. Length of abdomen 3.11.

Sternum brown, covered with long and fine white hairs and white scales. Coxae fawn and partly brownish-fawn, covered densely with distinct white scales and sparsely with white setae. Maxillary plates and labium fawn with white tips. Chelicerae. Anterior surface pale brown, posterior dark brown with brown setae. Typical but without tooth.



Figs. 85–86. *Yllenus robustior* sp. n. — ♂, right copulatory organ: 85 — lateral view of inner surface, 86 — outer surface.

Pedipalps. Copulatory organ (figs. 85, 86) similar to that in previous species. Elongated tip of cymbium and stylus are somewhat thinner. Bulbus seems to be smaller than in previous species. Club-like protuberance on the cymbium somewhat bigger, its ventral margin straight, and the dorsal bent ventrally. In *Y. hamifer* SIM. the same protuberance was slightly bent and inclined ventralwards. Hook-like apophysis of tibia (fig. 18) thinner and finer than in previous species. Ventral protuberance on femur (fig. 33) somewhat longer, more sharp and more distinctly inclined forwards.

Legs yellow-fawn with paler white-yellow tarsi and metatarsi III and IV. Brown spots occur on the lateral sides of the following joints: tarsi I–IV — brown half ring through dorsal and lateral surfaces near the basal end of the joint; metatarsi I–IV — single spots on lateral surfaces near basal end of the joint; tibiae I–IV — two pairs of brown spots on lateral surfaces, near basal and apical end of the joint; patellae I–IV — a pair of spots on the lateral surfaces in the middle of the joint. On femora I–IV there are triangular brown spots on the dorsal and lateral surfaces near the apical end of the joint. Legs are covered densely with white scales and brown and white setae. Brown setae occur mainly on the dorsal surfaces of joints. Spines present. Claws typical, without teeth. Scopulae strongly worn; tarsal tufts present. Length of segments of legs: I 1.08 + 0.90 + 1.22 + 1.39 + 1.89, II 1.08 + 0.96 + 1.11 + 1.17 + 1.75, III 1.22 + 1.08 + 1.08 + 1.22 + 2.03, IV 1.14 + 1.22 + 1.62 + 1.20 + 2.38. Ratio d 1.5.

Description of female

Cephalothorax dark brown with margins and angles of eye field almost black. In the centre of eye field there is a large and pale round spot, covering $\frac{2}{3}$ of the field. In one specimen this spot is fawn with small darker dots, in a second, it is uniformly light fawn. Eye field covered densely with large white scales. Scales on the thorax a bit longer, narrower and less dense. In the paler specimen there are colourless scales with brown longitudinal streaks which form an indistinct darker streak in the posterior part of the field. There is no such streak and no scales in the darker specimen. Stout brown bristles form a transverse row above eyes I. Similar but smaller bristles are scattered over the eye field.

Sides of the cephalothorax fawn-brown with a paler strip above the ventral margin. Ventral edge of the cephalothorax black covered ventrally with large white scales. Length of cephalothorax 3.34 (3.22)¹, length of eye field 1.39 (1.44), width of eye field I 1.89 (1.89), width of eye field III 1.96 (1.89). Ratios: *a* 0.42 (0.46), *b* 0.96 (1.00), *c* 0.74 (0.76).

Abdomen dorsally fawn-grey with a gold shade and with a number of whitish spots which do not form any distinct pattern. Covered with white scales. On the paler specimen there is a mid-longitudinal lancet-shaped but indistinct streak, consisting of colourless scales with a median brown streak. Darker specimen has a greyish shade in this place but all scales are uniformly white. Abdomen ventrally whitish-grey with a yellow shade, covered with indistinct white scales and setae. Length of abdomen 4.37 (both specimens).

Epigynum similar to that in *Y. hamifer* SIM. The vaginal roof is broad and its posterior margin shallowly procurved; the ridge is broad; copulatory openings slit-like but distinctly visible (fig. 87).

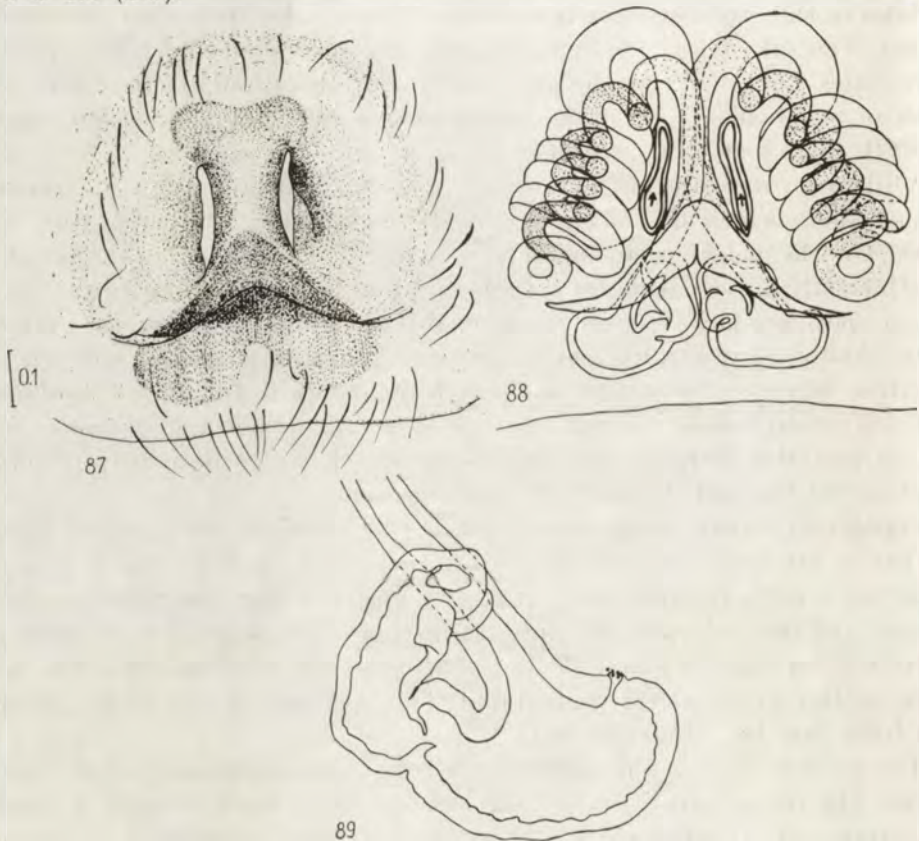
Copulatory canals form double spirals like those in the previous species, but canals are narrower and coils of internal spiral more tightened. External spiral has 5 coils, internal one 7 (fig. 88). Posterior parts of these canals run straight and parallel up to the anterior margin of the vaginal roof where they separate at an angle of about 45° and join the receptacula seminis at the height of the posterior edge of the vaginal roof. This structure is very strikingly different from that in *Y. hamifer* SIM.

The anterior part of the spermatheca is less elongated than in the previous species, the distal part is quite long but has fewer coils than in *Y. hamifer* SIM. Accessory gland opening distinct and simple, without any additional sclerotized structures (figs. 58, 89).

Sternum dark brown, covered with long and fine white hairs and very large white scales. Coxae pale fawn, covered densely by long, fine white setae and single white scales. Maxillary plates and labium dark brown with white tops. Chelicerae dark brown, typical, without tooth.

¹ Figures in parentheses — measurements of the second specimen.

Legs pale fawn with transverse brown stripes on the lateral surfaces. In the second specimen, however, these stripes are reduced to small spots on the lateral edges of the same joints. There is just one of these stripes on tarsi and metatarsi I-IV, but two stripes on patellae and tibiae I-IV. On the dorsal surface of femora I-IV, near the apical end, there is a large triangular brown spot. Legs covered with white scales and white and brown setae. Spines present. Claws typical with teeth on claws I. Scopulae short and probably worn; tarsal tufts III-IV typical. Length of segments of legs: I $0.96 + 0.78 + 1.08 + 1.26 + 1.67$ ($0.96 + 0.84 + 1.11 + 1.35 + 1.66$), II $0.99 + 0.75 + 1.02 + 1.22 + 1.71$ ($0.93 + 0.87 + 1.08 + 1.26 + 1.71$), III $1.17 + 1.05 + 1.08 + 1.14 + 1.82$ ($1.20 + 0.93 + 1.02 + 0.99 + 1.96$), IV $1.08 + 1.31 + 1.57 + 1.39 + 2.80$ ($1.11 + 1.31 + 1.57 + 1.31 + 2.52$). Ratio d 1.5 (1.5).



Figs. 87-89. *Yllenus robustior* sp. n. - ♀, copulatory organs: 87 - epigynum, 88 - epigynum after maceration, 89 - right spermatheca, dorsal view.

***Yllenus coreanus* sp. n.**

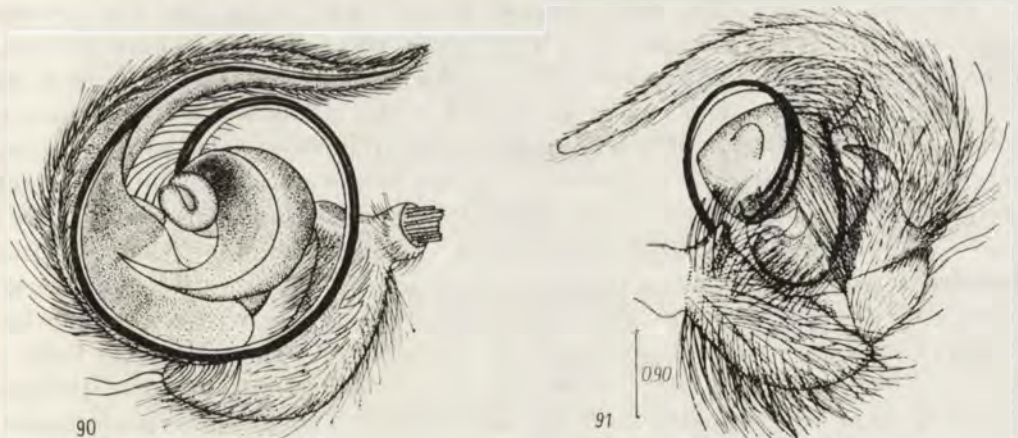
Material. North Korea: Pyongyang, 14. IX. 1959, leg. B. PISARSKI - 4 ♂♂ (biggest ♂ - holotype, other paratypes) (I. Z. PAN-Warszawa).

Description of male

Cephalothorax uniformly black, covered with whitish scales with a black median streak. There are indistinct spots of white scales beyond lateral eyes I and behind eyes III. There is also a transverse streak of white scales behind eyes I. There is a row of stout white bristles above eyes I and this is followed by a similar row of black bristles. Large black bristles are scattered over the eye field and somewhat more densely below the lateral margins of the eye field and behind it. The scales on the thorax are somewhat elongated and slightly undulated, their dark median streak is somewhat less distinct. Ventral margin of the cephalothorax covered densely with small white scales. Length of cephalothorax 2.66, length of eye field 0.96–1.20 (mean 1.13), width of eye field I 1.44–1.62 (mean 1.53), width of eye field III 1.44–1.62 (mean 1.53). Ratios: *a* 0.36–0.45 (mean 0.42), *b* 1.00, *c* 0.67–0.78 (mean 0.74).

Abdomen dorsally grey-black with fawn spots, covered uniformly with greyish scales each with an indistinct darker median streak. The gaps between scales are quite large and the black surface of the abdomen is clearly seen. No clear colour pattern present. On the anterior part of the abdomen and on the sides there are a small number of black and grey setae. Spinnerets grey-black with yellow-fawn tips. Abdomen ventrally grey-fawn covered sparsely with white scales. Length of abdomen 2.80–3.34 (mean 2.94).

Sternum black-brown, covered by long and fine white hairs and a few white scales. Coxae grey-brown with an olive shade; on the lateral surfaces there is a large fawn triangular spot. The size of this spot decreases from $\frac{1}{2}$ of the surface on coxa IV to $\frac{1}{4}$ on coxa I. All coxae covered with white scales and white setae. Maxillary plates and labium grey-brown with white tips. Chelicerae (fig. 72) brown-fawn posteriorly, anterior surfaces dark brown with dark brown setae, typical.



Figs. 90–91. *Yllenus coreanus* sp. n. — ♂, left copulatory organ, lateral view: 90 — inner surface, 91 — outer surface.

Pedipalps (figs. 90–91) similar to the two previous species. The elongated tip of the cymbium seems to be somewhat longer and thinner. Hook-like apophysis of tibia (fig. 19) more bent. Ventral protuberance of femur (fig. 34) is regularly conical and leans backward.

Legs. Dorsal surfaces fawn, ventral ones grey-fawn with an olive shade. The lateral (posterior and anterior) surfaces are: tarsus and metatarsus I–IV — fawn; tibia I–IV — almost black; patella I–IV — fawn with a dark diagonal spot; femur I–IV — black-brown with oval fawn-brown spots. Legs covered with white scales, grey and brown setae. Spines. Claws I–IV typical, without distinct teeth. Scopulae I–II typical, consisting of stout black setae with white tips. Tarsal tufts III–IV typical. Length of segments of legs: I 0.78–0.69 (mean 0.74)+0.72–0.60 (0.64)+1.08–0.96 (1.00)+1.20–1.14 (1.17)+1.62–1.26 (1.47), II 0.72–0.69 (0.71)+0.66–0.60 (0.64)+0.87–0.78 (0.83)+1.08–0.93 (1.02)+1.49–0.87 (1.26), III 0.87–0.78 (0.82)+0.87–0.81 (0.86)+0.87–0.84 (0.85)+0.90–0.84 (0.86)+1.67–1.02 (1.43), IV 0.99–0.84 (0.89)+1.08–0.96 (1.03)+1.22–1.17 (1.20)+1.20–1.08 (1.15)+2.10–1.89 (2.01). Ratio *d* 1.5–1.3 (1.4).

Female unknown.

Yllenus bajan sp. n.

Material. Mongolia: Zuun-Bajan, 75 km south from Sajn-Shand, 2. IV. 1962, leg. R. BIELAWSKI et B. PISARSKI — 1 ♂ (allotype), 1 ♀ (holotype). Mongolia: Sajn-Shand. 30. V. 1962, leg. R. BIELAWSKI et B. PISARSKI — 1 ♂ (paratype) (I. Z. PAN-Warszawa).

Description of male

Cephalothorax. Eye field covered densely with white and black scales together with a few orange ones. They form the following colour pattern: there is a thin white stripe along the anterior eye row, the ends of which are enlarged reaching the level of lateral eyes I. Behind this white stripe there is a broad procurved stripe of black scales (that is colourless scales with an intensely black median streak) together with a few white ones. Beyond this black stripe there is a second white stripe, running in its median part parallel to eyes I and then turning diagonally towards eyes III and touching their internal borders. It is extended by two quite broad stripes running towards the posterior margin of the cephalothorax. The distance between these stripes is somewhat smaller than that between the ends of the second white stripe on the eye field — they are located at $\frac{1}{3}$ and $\frac{2}{3}$ of the breadth of the thorax, and the distance between them grows smaller towards the posterior end of the cephalothorax. The central part of the eye field inside the arch of the second white stripe is covered by black scales together with a few white and orange scales (these

latter are more distinct on the paratype). This black spot extends farther onto the thorax between the white stripes. Scales on that part are distributed less densely, are narrower, and slightly undulated. Lateral surfaces of cephalothorax are brown and covered sparsely with white scales. Near the ventral margin of the cephalothorax there is a stripe of dense white scales, the margin itself is dark grey and its ventral edge is covered with white scales. Above eyes I there is a row of stout white bristles together with a few brown ones. Below the lateral margins of the eye field there are large black bristles, and a small number of them are scattered over the surface of the eye field. Length of cephalothorax 2.38, length of eye field 0.84, width of eye field I 1.44, width of eye field III 1.62. Ratios: a 0.35, b 0.89, c 0.58.

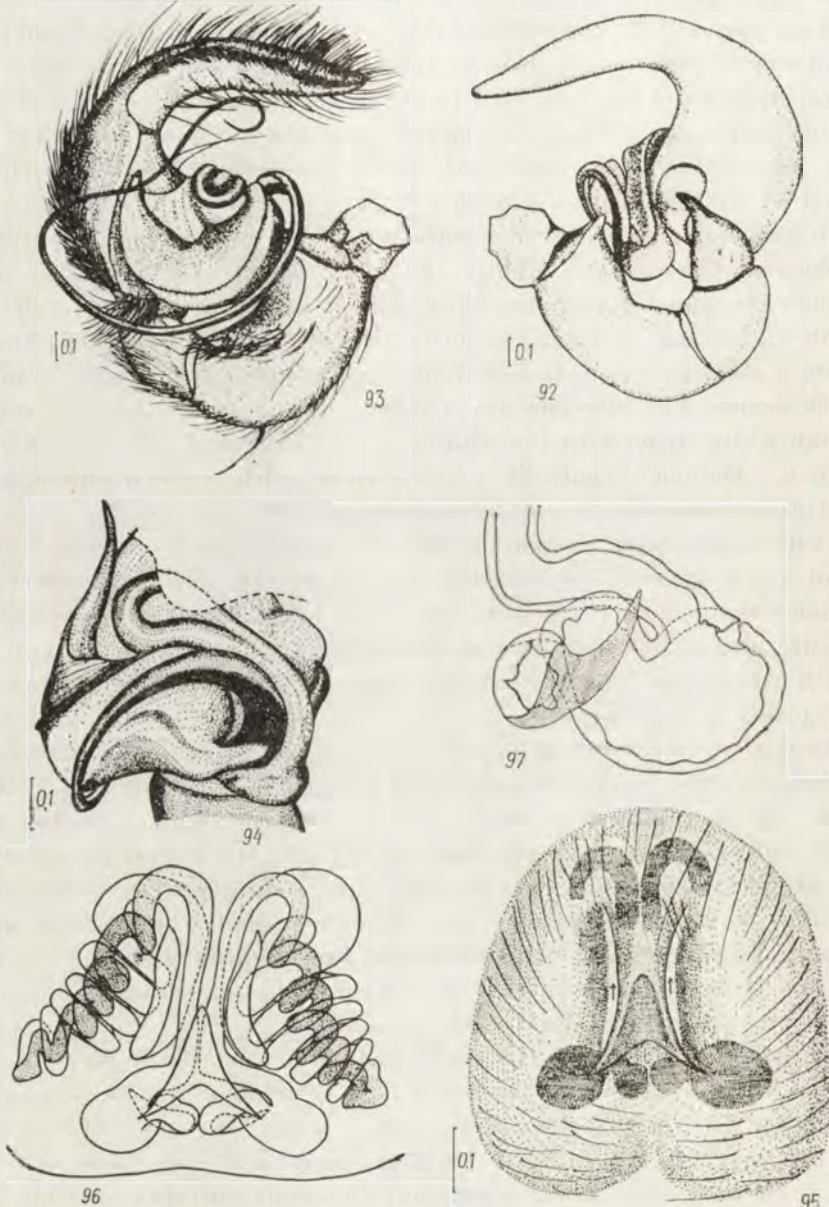
Abdomen dorsally. General colouration — greyish, covered densely with white, black and grey scales. White ones are concentrated along the margins of the abdomen and form also a white median stripe in the posterior half of the abdomen, but not reaching the posterior end of the abdomen. In the paratype there is straight white stripe extended anteriorwards by the spot of intensely black scales. The allotype has a narrow transverse white stripe joining the median white stripe with the white margin of the abdomen. Spinnerets are fawn-brown. Abdomen ventrally greyish-white with a fawn shade, covered with distinct white scales. Length of abdomen 1.96.

Sternum brown with a paler central part, covered with long and fine white hairs and a few large white scales. Coxae fawn, covered with white scales, very numerous on coxa I, less numerous on II, III and IV. On coxae I and II there are also sparse brown setae. Maxillary plates and labium fawn-grey with white tips. Chelicerae dark brown anteriorly, fawn-brown posteriorly, typical.

Pedipalps. General outline of the copulatory organ similar to the previous species, but differing in the proportions of particular parts (figs. 3, 11, 92–94). Elongated tip of cymbium is much shorter, bulbus bigger, anterior end of conductor elongated. The stylus is somewhat shorter (its course on the drawing is different because of some translocation during preparation). The club-like protuberance on the lateral surface of cymbium is somewhat special, and the hook-like apophysis on the tibia is short and fine (fig. 20). Patella is somewhat longer and less triangular in lateral view. Femur is longer and a bit finer, and its ventral protuberance is characteristic (fig. 35).

Legs fawn, covered with white scales and setae, together with a few somewhat bigger brown setae. Along the dorsal surface of tibia I runs a stripe of black scales. Similar stripes (but less conspicuous) occur on tibiae II–IV. Lateral surfaces of tibiae I–III, patellae I–IV, and femora I–IV are more or less darkened and covered with black scales, but the same surfaces on tibia IV are yellow. Ventral surfaces of femora I–IV are yellow-fawn, densely covered with white scales and setae, giving them a white appearance. Scopulae I–II typical, tarsal tufts III–IV typical. Claws typical, the 1st one with a small tooth at $\frac{1}{3}$

of its length, other claws with indistinct combs of teeth (or blades) in the middle of their length. Length of segments of legs: I $0.75+0.75+0.75+0.60+1.44$, II $0.66+0.60+0.75+0.72+1.20$, III $0.72+0.72+0.66+0.63+0.84$, IV $0.78+0.84+1.05+0.99+2.10$. Ratio d 1.6.



Figs. 92–97. *Ylenus bajan* sp. n. — ♂, left copulatory organ: 92 — lateral view of outer surface, 93 — the same, inner surface, 94 — ventral view. ♀, copulatory organs: 95 — epigynum, 96 — epigynum after maceration, 97 — right spermatheca, dorsal view.

Description of female

Cephalothorax. Eye field black-brown, covered densely with broad whitish-silver semitransparent scales together with a few orange scales. General colouration of eye field silver-grey or olive-grey, depending on the angle of reflection of light. The scales on the thorax are less dense, elongated and slightly undulated. Lateral surfaces of the cephalothorax are olive-fawn-grey and there are rather more orange scales here. There is a yellow stripe near the ventral margin, quite broad (about $\frac{1}{3}$ of the height of the cephalothorax) and covered exclusively with white scales. The margin itself is grey and bald, its edge ventrally is covered with white scales. Above eyes I there is a row of stout white bristles with the addition of few yellow ones. On the lateral margins of the eye field and also in the posterior part of the field there are black bristles. On the thorax among the scales, there are scattered white setae. Length of cephalothorax 2.10, length of eye field 1.02, width of eye field I 1.44, width of eye field III 1.62. Ratios: *a* 0.48, *b* 0.89, *c* 0.78.

Abdomen dorsally pale fawn, covered with white scales with four brownish fawn spots arranged into two transverse, slightly inclined rows. These spots consist of brownish-fawn scales together with a few black ones scattered over them. There is also a similar single spot in the posterior part of the abdomen. The space between these spots is whiter than other areas of the abdomen. Abdomen ventrally whitish with a yellow shade, covered with sparse thin setae; the presence of scales has not been verified. Length of abdomen 2.52.

Epigynum similar to the previous species in its general outlines but different in details. Vaginal roof is narrow, copulatory openings long and narrow, ridge relatively long (fig. 95).

Copulatory canals resemble those in the previous species. The external spiral has 6 coils, internal 7. The twisting aside of the end of the spirals and loosening of their coils are artefacts made during preparation. The posterior parts of the copulatory canals separate at a broad angle on the level of the posterior margin of the vaginal roof. They run up to and fuse with the spermathecae externally to the angular ends of the vaginal roof (fig. 96). The anterior part of the spermatheca is rounded, the distal part is short and passes into the typically triangular canal. Opening of the accessory gland is funnel-like with the broad part directed to the interior of the spermatheca (fig. 60, 97).

Sternum dark brown with an elongated yellow spot in the centre, covered with long and fine white hairs and a few large white scales. Coxae white with a light yellow shade, covered with fine white setae arising from the black basal parts, and a few white scales. Maxillary plates and labium yellow with a fawn shade, covered sparsely with large black setae. Chelicerae brown, anterior surface covered with white scales, typical, without tooth.

Legs uniformly white, covered with white scales and a few orange and black ones. On the tarsus, metatarsus, tibia and patella I there are also dense

short black setae. The same black setae are much less numerous on the similar joints of leg II, and on legs III and IV there are only very few of them. Femora I-IV also have white setae as well as scales; near the distal end of the joint, and on the lateral surface, there are fine brown stripes. Scopulae I and II typical, black; tarsal tufts also black, typical. Claws typical. Length of segments of legs, I $0.60 + 0.57 + 0.78 + 0.90 + 1.20$, II $0.54 + 0.39 + 0.57 + 0.72 + 1.05$, III $0.66 + 0.60 + 0.63 + 0.60 + 1.14$, IV $0.72 + 0.81 + 1.02 + 0.84 + 1.89$. Ratio d 1.6.

Yllenus bator sp. n.

Material. Mongolia: Sajn-Shand, 31. V. 1962, leg. R. BIELAWSKI et B. PISARSKI - 1 ♀ (holotype) (I. Z. PAN - Warszawa).

Description of female

Cephalothorax dark brown with black eye field. Eye field covered densely with silver-white scales. There is no colour pattern except an indistinct triangular spot consisting of sparsely scattered black scales amongst white ones. This triangular spot is located at the level of eyes III and its base is equal to $\frac{1}{4}$ of the width of the eye field. Thorax covered with white scales, narrow and slightly undulated, distributed less densely than those on eye field. The ventral edge of cephalothorax is covered with broad white scales. There is a row of stout grey and brown-black bristles above eyes I. Black bristles are scattered over the eye field and concentrated below its lateral edges. Length of cephalothorax 1.53, length of eye field 0.69, width of eye field I 0.93, width of eye field III 1.14. Ratios: a 0.45, b 0.81, c 0.74.

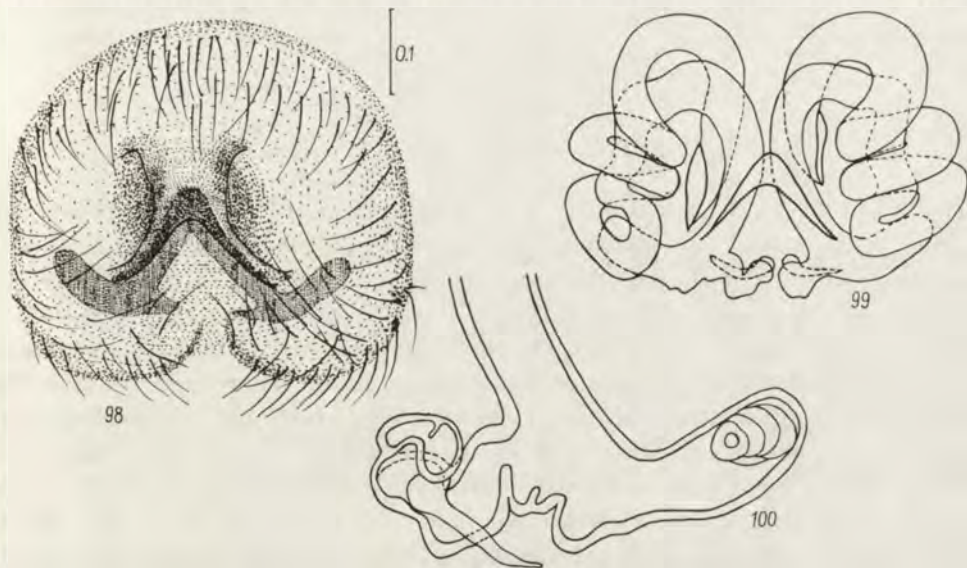
Abdomen dorsally. Abdomen is partly macerated and damaged and its present white-cream colour may be an artefact. Covered with white scales; along the mid-longitudinal line there are a few separated black stripes consisting of black scales. There is no other trace of colour pattern. Over the whole surface of the abdomen are scattered black bristles. Abdomen ventrally cream-white, covered with white scales and grey setae. Length of abdomen 2.03.

Epigynum. Posterior edge of the vaginal roof very deeply procurved, the copulatory openings located at the bottom of the deep groove and visible only after maceration, the ridge between them broad and short (fig. 98).

The copulatory canals form spirals with three external coils, the internal parts of the spirals do not form regular coils but run as a slightly winding canal (figs. 46, 99).

The spermathecae are located posteriorly to the end of the vaginal roof, their proximal parts are very elongated; distal parts are also elongated and then coiled near their ends. The opening of the accessory gland located on the ventral wall of the spermatheca is distinct and surrounded by a few concentric sclerotized layers (figs. 59, 100).

Sternum brown with an irregular fawn spot between coxae III, covered with long and fine white hairs and a few distinct and elongated white scales. Coxae whitish-yellow, covered with white scales and white setae. Maxillary plates and labium fawn bordered with white. Chelicerae brown, typical.



Figs. 98-100. *Yllenus bator* sp. n. — ♀, copulatory organs: 98 — epigynum, 99 — epigynum after maceration, 100 — spermatheca, dorsal view.

Legs yellow-fawn, covered with white scales sprinkled with brown ones and with white and black setae. Spines present. There are dark brown triangular spots on the dorsal surfaces of femora I-IV, close to their distal ends. On the lateral surfaces of patellae I-IV there are dark brown spots. Dark brown "bracelets" (broken on the dorsal surface of the joint) occur on tibiae I-IV, near their proximal ends. Claws, scopulae and tarsal tufts — typical. Length of segments of legs: I $0.42 + 0.33 + 0.45 + 0.54 + 0.75$, II $0.36 + 0.30 + 0.39 + 0.42 + 0.66$, III $0.47 + 0.39 + 0.33 + 0.39 + 0.75$, IV $0.42 + 0.54 + 0.66 + 0.60 + 1.17$. Ratio d 2.0.

Yllenus baltistanus DI CAPORIACCO, 1935

Synonym: *Yllenus baltistanus shaksgamicus* DI CAPORIACCO, 1935.

Material: a) "*Yllenus baltistanus* Skardu ... 2200 ..." — 1 ♂ (syntype); "*Yllenus baltistanus* DI CAP. Paju ... 1550. 28. VII." 1 ♀ juv. (syntype); "*Yllenus baltistanus shaksgamicus* Morene del Gho. Ghasherbrum m. 4400 5 luglio" — 1 ♀ juv. (syntype?) (MZU-Florence)¹. b) Mongolia, Sajn-Shand, 31. V. 1962, leg. R. BIELAWSKI et B. PISARSKI — 1 ♂ 2 ♀♀. c) "Prz. 15" — Mongolia or Sinkiang prov. (China), collected by M. PRZEWAŁSKI presumably during his fourth expedition in 1883-1885 — 1 ♂ (I. Z. PAN-Warszawa).

¹ The above specimens are the only ones kept in the collection of DI CAPORIACCO in Florence. The remaining specimens mentioned in the original description are kept in Museo Civico di Storia Naturale in Milan, Italy.

The specimen collected by PRZEWALSKI has been examined by W. KULCZYŃSKI who recognises it as a new species and gives it a specific name of his own. However, he has never published its description. The males from the collection of DI CAPORIACCO, PRZEWALSKI and from Sajn-Shand are not exactly identical, but their resemblances are none-the-less so striking that the author cannot classify them as belonging to separate species. The problem as to whether these specimen belong to the same species or to two different ones can be solved only after examination of females studied by DI CAPORIACCO and, perhaps, a large number of specimens.

Description of male (based on specimen from Sajn-Shand)

Cephalothorax brown-black with brown-fawn eye field, covered with silverish-white scales, very dense on the eye field and less dense on the thorax. Along the mid-line of the thorax and posterior part of the eye field stretches a dagger-shaped streak of dark scales. On both sides of the anterior point of the streak, somewhat anterior to it, there are two small dark spots of dark scales. On the lateral surfaces of the cephalothorax there are some orange scales sprinkled among the white ones. There is also a fawn belt above the ventral margin of the carapace, covered with white scales. White scales also cover the clypeus. There is a row of stout white bristles above eyes I. Black bristles are scattered on the surface of the eye field and a number of similar bristles is concentrated below the lateral margins of the eye field. Length of cephalothorax 2.10, length of eye field 0.96, width of eye field I 1.35, width of eye field III 1.53. Ratios: *a* 0.46, *b* 0.88, *c* 0.71.

Abdomen dorsally fawn, covered densely with silver scales among which are scattered gleaming dark greenish scales. These darker scales, slightly narrower and longer than the silver ones, form a number of darker spots covering $\frac{3}{4}$ of the dorsal surface of the abdomen. But there is no distinct pattern in the distribution of these spots. Abdomen ventrally whitish, covered with silver-white scales and white setae. Length of abdomen 2.03.

Sternum dark brown, covered with long and fine white hairs and a few broad white scales. Coxae I-IV whitish-yellow with a pale fawn gleam, covered with white scales and setae. Maxillary plates and labium fawn bordered with white. Chelicerae brown, anteriorly brown-black and covered with white scales. Typical, without tooth.

Pedipalps. Copulatory organ (figs. 4, 12, 101-103) resembles in its general features the organs of the previously mentioned species, but differs in the proportions and shapes of various parts. Elongated tip of the cymbium is relatively short, equal to the length of the conductor and relatively robust. Contrary to the previous species, this tip is not bent but only slightly inclined ventralwards. Bulbus relatively large, conductor long and flimsy expanded into a flat round plate near its pointed end. Stylus short, its length equal to that of the conductor. Club-like protuberance of the cymbium quite robust; hook-like apophysis of the tibia long and robust (fig. 21).

Legs fawn-brown with dark brown lateral anterior surfaces; there are dark stripes on the fawn dorsal surfaces. Covered densely with white scales and white and black setae. Spines present. Tarsus I is covered with a dense brush of long



Figs. 101-107. *Yllenus baltistanus* CAP. — ♂, left copulatory organ. Mongolian specimen: 101 — lateral view of outer surface, 102 — the same, inner surface, 103 — ventral view. Syntype specimen: 104 — lateral view of outer surface, 105 — the same, inner surface, 106 — ventral view, 107 — pedipalpal femur.

black setae, covering the whole ventral and lateral anterior surface. Tarsi II–IV have a streak of black setae, much less striking, however, in their appearance. Claws typical with distinct teeth on the basal parts I–II and in the middle of III–IV. Scopulae and tarsal tufts typical. Length of segments of legs: I $0.84 + 0.87 + 1.26 + 0.93 + 1.40$, II $0.60 + 0.63 + 0.69 + 0.75 + 1.11$, III $0.66 + 0.69 + 0.66 + 0.66 + 1.17$, IV $0.81 + 0.75 + 0.90 + 0.90 + 1.80$. Ratio \bar{d} 1.3.

Specimen from PRZEWAŁSKI's expedition. Much paler than the above described which, however, may have resulted from partial maceration of the soft tissues. Cephalothorax brown, eye field fawn, with eyes bordered black. Abdomen yellowish with grey streaks, partly macerated. Sternum fawn-grey with a lighter yellow spot along its median line. Legs yellowish.

Specimen is devoid of any colour pattern, it resembles the specimen from Sajn-Shand by the presence of white scales on the anterior surface of the chelicerae; the presence of a brush of faded fawn-grey setae on the ventral surface of tarsus I; and somewhat less dense brushes on the other tarsi. Copulatory organ very similar to that of the above described specimen.

Syntype specimen from Skardu. Colouration of the cephalothorax similar to that of the specimen from Sajn-Shand, scales covered with a fine dust so their colour cannot be recognised. Bristles above eyes I brown. Length of cephalothorax 2.41, length of eye field 1.33, width of eye field I 1.67, width of eye field III 1.77. Ratios: a 0.55, b 0.94, c 0.80.

Abdomen dorsally darker than that of Sajn-Shand specimen — brown-grey, covered with semitransparent and slightly reddish-fawn scales. Larger setae of the same colour scattered over the abdomen. Lack of any colour pattern. Abdomen ventrally — greyish-fawn with semitransparent scales. Length of abdomen 2.46.

Sternum hairless although this may be the result of deterioration. Coxae dark brown with light brown spots, covered with large whitish semitransparent scales and white-grey setae. Maxillae and labium brown, bordered with white.

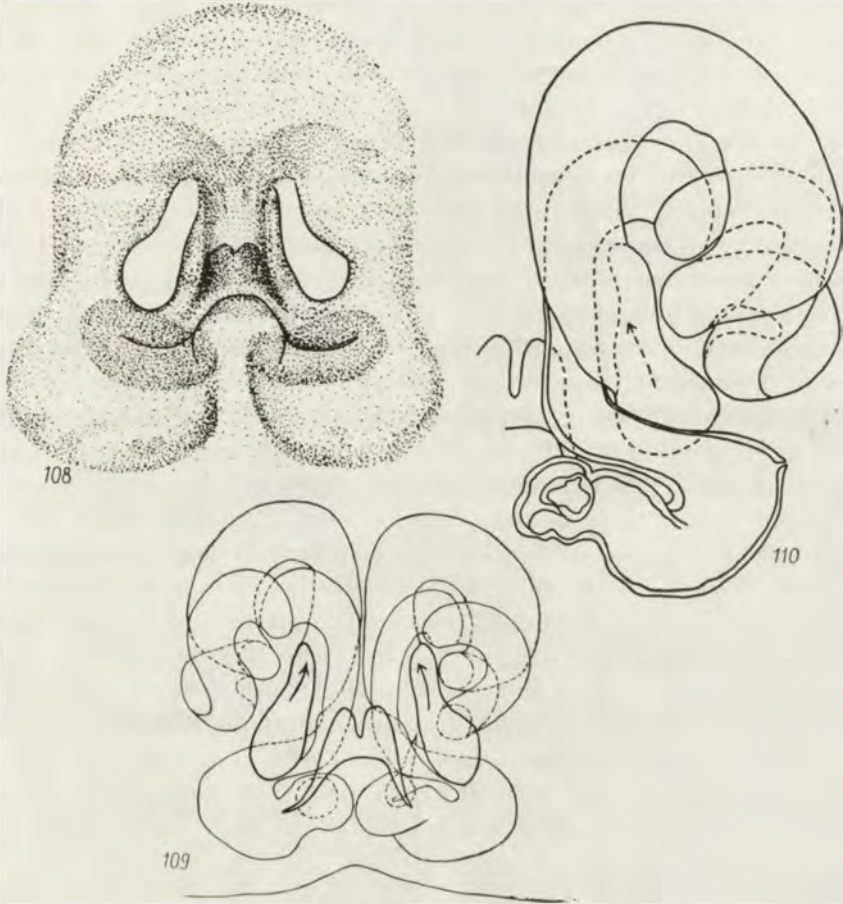
Pedipalps. Copulatory organ (figs. 104–107) very similar to that of the Sajn-Shand specimen. There are slight differences in the shape of the club-like protuberance of the cymbium and anterior margin of the bulbus.

Legs similar, with only ventral surfaces of the joints darkened. The brush of dark brown setae covers not only the tarsus but also the metatarsus, tibia and patella I. There is no trace of similar brushes on the other legs. Length of segments of legs: I $1.06 + 1.03 + 1.60 + 1.23 + 2.02$, II $0.86 + 0.79 + 0.98 + 0.98 + 1.70$, III $0.89 + 0.93 + 0.86 + 0.84 + 1.57$, IV $0.93 + 1.25 + 1.35 + 1.11 + 2.51$. Ratio \bar{d} 1.57.

Description of female

Cephalothorax black-brown, eye field covered densely with white and yellow-orange scales. On the posterior part of the eye field and on the thorax there is a median lancet-shaped dark streak consisting of grey scales each of

which is white with a black median streak. Near the tip of this streak, at the level of eyes II, there are two dark spots consisting of a few darker scales. Thorax covered with white, slightly elongated and undulating scales, distributed less densely than those on the eye field. The scales above the ventral margin of the carapace are somewhat bigger and distributed quite densely.



Figs. 108–110. *Yllenus ballistanus* CAP., Mongolian specimen — ♀, copulatory organ: 108 — epigynum, 109 — epigynum after maceration, 110 — left spermatheca and copulatory canal, dorsal view.

The margin itself is bald and black-brown, the edge underneath covered densely with white scales. There are two horizontal broad stripes of white scales on the clypeal surface of the cephalothorax, they start from below eyes I median and end on the lateral edge of the clypeal face below eyes I lateral. Below the median junction of these stripes, underneath the space between eyes I median, there is a triangular spot of white scales with a broad base touching the ventral

margin of the clypeus. There is a row of white, cream and brown bristles above eyes I. Black bristles scattered over the eye field (rather more densely than in the male), are concentrated below the lateral margins of the eye field. Length of cephalothorax (two specimens) 2.31–2.10, length of eye field 1.08–1.08, width of eye field I 1.48–1.44, width of eye field III 1.66–1.62. Ratios: *a* 0.46–0.51, *b* 0.89–0.87, *c* 0.73–0.75.

Abdomen dorsally yellowish-white, covered with white scales together with a few grey ones, forming "dirty" spots. Abdomen ventrally yellowish-white covered with white scales and greyish-white setae. Length of abdomen 2.38–3.34.

Epigynum. The shape of the epigynum differs somewhat from that of the previous species. The copulatory openings are elongated and distinctly broadened posteriorly. The ridge between the openings is broad and short, the posterior edge of the vaginal roof is deeply and broadly procurved (fig. 108).

The copulatory canals (figs. 47, 109) form 4 entangled loops, but they do not form spirals. The spermathecae (figs. 61, 110) are poorly developed and appear as somewhat broader and stronger sclerotized portions of the copulatory canals. The opening of the accessory gland is not very conspicuous.

Sternum light brown, covered with white hairs and a few white scales. Maxillary plates and labium fawn bordered with white. Chelicerae brown-fawn, typical, their anterior surface covered with white scales.

Legs light fawn, their dorsal surfaces with a yellow shade, the ventral one — whitish; the lateral surfaces are greyish-fawn. Covered with white scales with a few dark ones and white and brown setae; spines present. Claws typical with teeth located in their middle (claws III and IV) or in their basal part (claws I and II). Scopulae and tarsal tufts typical. There are no brushes on the ventral surfaces of joints, comparable with those in males. Length of segments of legs: I 0.81–0.75 + 0.63–0.48 + 0.75–0.84 + 0.96–0.96 + 1.30–1.22, II 0.66–0.66 + 0.51–0.48 + 0.63–0.60 + 0.96–0.66 + 1.08–1.08, III 0.72–0.63 + 0.54–0.60 + 0.63–0.63 + 0.60–0.63 + 0.99–0.93, IV 0.69–0.66 + 0.81–0.66 + 1.05–0.96 + 0.99–0.87 + 1.80–1.76. Ratio *d* 1.7–1.5.

Yllenus mongolicus sp. n.

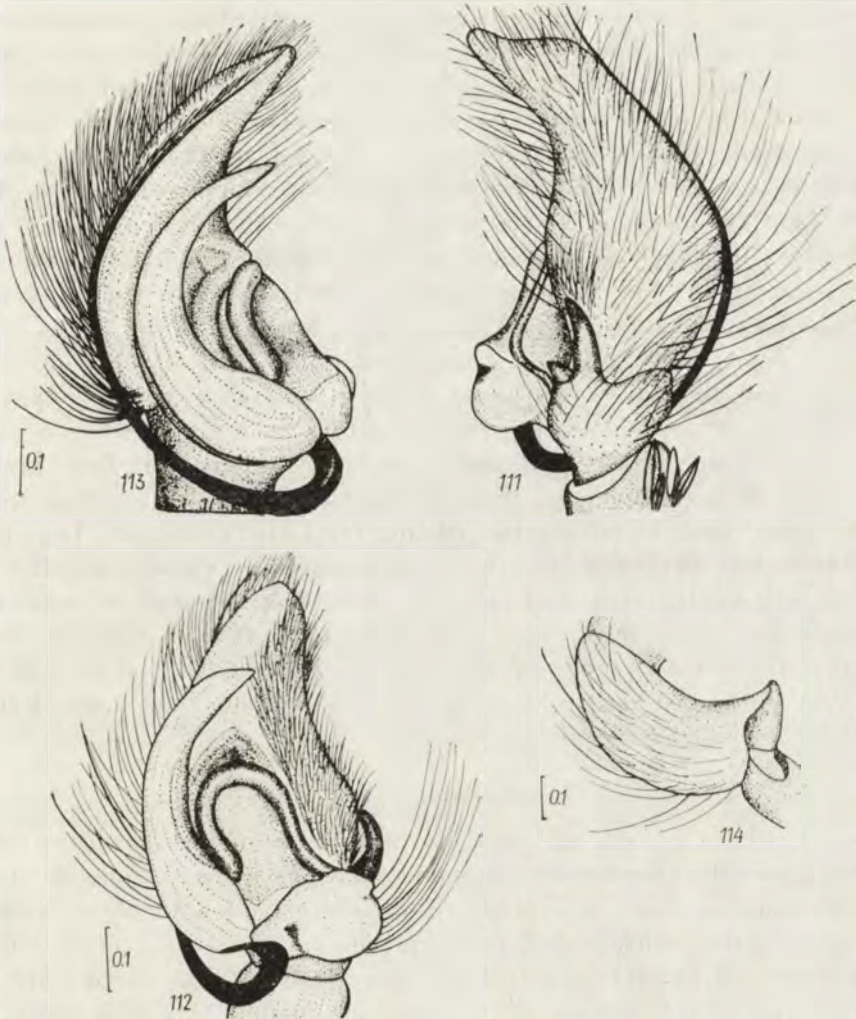
Material: Mongolia, Sajn-Shand, leg. R. BIELAWSKI et B. PISARSKI. 30. V. 1962 — 2 ♂♂, 8 ♀♀, 31. V. 1962 — 1 ♀ (biggest ♂ — holotype, biggest ♀ — allotype, other — paratypes) (I. Z. PAN-Warszawa).

Description of male

Cephalothorax dark brown, eye field covered with yellowish scales and a few white ones concentrated into 3 white longitudinal stripes. The median white stripe begins between median eyes I and stretches up to the level of eyes II. The two lateral white stripes begin between median and lateral eyes I

and run up to the eyes III, parallel to the lateral margin of the eye field. Thorax is rather bald now, with the remnants of white scales. The ventral margin of the carapace is black, its edge covered ventrally with broad white scales. There is a row of white, yellow and grey bristles above eyes I. Black bristles are scattered over the eye field and concentrated beneath the edges of it. Length of cephalothorax 1.44–1.47, length of eye field 0.72–0.72, width of eye field I 0.90–1.08, width of eye field III 0.93–1.11. Ratios: *a* 0.50–0.49, *b* 0.83–0.84, *c* 0.80–0.77.

Abdomen dorsally greyish-brownish-black, covered with white scales with a silver or sometimes yellow gleam. There is no trace of any colour pattern.



Figs. 111–114. *Ylenus mongolicus* sp. n. — ♂, left copulatory organ: 111 — lateral view, outer surface, 112 — the same, inner surface, 113 — ventral view, 114 — pedipalpal femur.

Abdomen ventrally grey, covered with whitish scales. Length of abdomen 1.35–1.44.

Sternum brown with black margin, covered with fine white hairs and white scales. Coxae yellowish-white covered with white setae and white scales. Maxillary plates and labium light fawn bordered with white. Chelicerae fawn brown, typical, with the anterior surfaces covered with white and yellow scales and white hairs.

Pedipalps. The copulatory organ (figs. 5, 13, 111–113) is quite distinctive. Whilst bearing a general similarity to the copulatory organs of other species of the *hamifer* group, it resembles also the copulatory organs occurring in the *albocinctus* and *arenarius* groups.

The cymbium is quite long but there is no elongated and ventrally bent tip. Stylus shorter than in all previous species and equal to the length of the cymbium. The conductor differs from all previous species in that it is not robust but it is falciform and delicate. Bulbus large, its proportions approaching those in the *albocinctus* group; its posterior part is well developed. The alveola, absent in the previous species, is visible in front of the anterior margin of the bulbus. The club-like protuberance on the internal surface of the cymbium is absent. The hook-like apophysis of the tibia (fig. 22) is slender; the apical edge of the tibia ventral to the apophysis is concave and passes into the protuberance resembling those encountered in the *albocinctus* group (figs. 36, 114).

Legs I seems to be relatively longer than those in all previous species. Metatarsus and tibia I are black and densely covered with long, black setae. The basal part of tarsus I is black-brown, while the apical part is white. The remaining segments of leg I as well as legs II–IV are light fawn-grey with their lateral surfaces darkened (except the tarsi) and darker rings near the joints between tarsi, metatarsi and tibiae. Tarsi II–IV whitish. Legs covered with white scales; white and black setae; spines present. Claws typical; scopulae I–II relatively small; tarsal tufts typical. Length of segments of legs: I 0.39–0.45 + 0.60–0.60 + 0.69–0.81 + 0.66–0.69 + 1.08–1.11, II 0.39–0.39 + 0.33–0.36 + 0.42–0.42 + 0.42–0.45 + 0.69–0.69, III 0.42–0.42 + 0.39–0.39 + 0.39–0.39 + 0.36–0.39 + 0.75–0.78, IV 0.48–0.54 + 0.51–0.54 + 0.66–0.66 + 0.57–0.60 + 1.26–1.35. Ratio d 1.7 (both specimens).

Description of female

Cephalothorax black or brown-olive-grey, covered with white, yellowish and black scales. The number of scales of each colour varies among the different specimens, some of them are completely devoid of yellow or black scales. Eye field covered with white scales; from the median eyes I stretch two longitudinal streaks of black or sometimes yellow scales. These streaks are hardly visible or even completely absent in some specimens. Thorax is more or less bald. The ventral edge of the carapace ventrally is covered with large white scales. There are several long black bristles above eyes I, several others occur

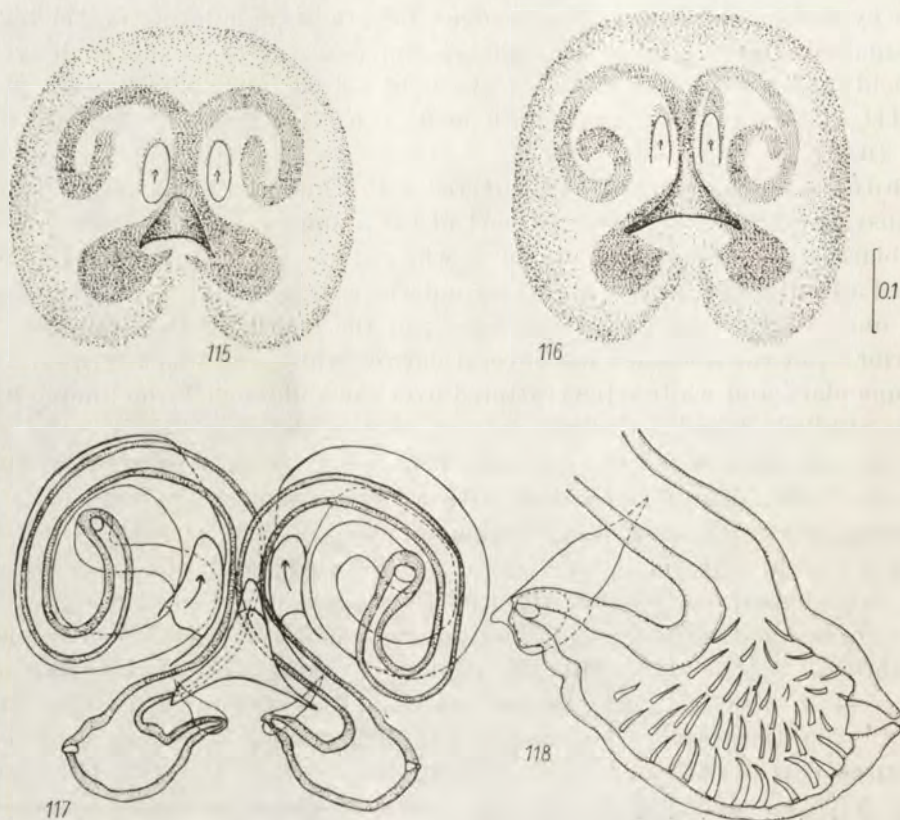
on the eye field and below its lateral edges. Length of cephalothorax (the biggest and smallest and the mean of eight specimens): 1.58–1.35 (1.47), length of eye field 0.75–0.63 (0.70), width of eye field I 1.02–0.93 (0.98), width of eye field III 1.22–1.11 (1.16). Ratios: *a* 0.50–0.44 (0.47), *b* 0.87–0.83 (0.85), *c* 0.74–0.65 (0.71).

Abdomen dorsally light fawn, covered with white and black scales arranged in transverse stripes. The anterior part of the abdomen is thus white, followed by a black stripe and then again by a white stripe with an enlarged diamond-shaped area of white medially. This second white stripe is followed by the second black one. All 4 stripes cover together $\frac{3}{4}$ of the length of the abdomen. The posterior $\frac{1}{4}$ of the abdomen has several narrow white and black stripes. There are some black and white setae scattered over the abdomen. From among 9 specimens studied, 3 had a distinct pattern on the abdomen, 5 displayed some traces of that pattern and one specimen had no trace of any pattern. Abdomen ventrally light fawn-grey, covered with whitish, semitransparent scales and with grey and black setae. Length of abdomen 1.80–2.10 (1.92).

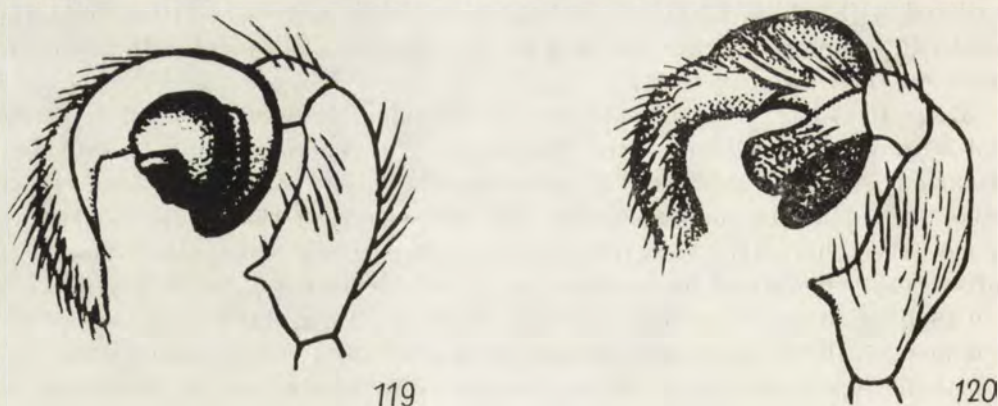
Epigynum. The copulatory openings oval and small, the ridge between them flat; vaginal roof is small with indistinctly procurved posterior edge. The epigynum is semitransparent and loops of the copulatory canals can be clearly seen through it (figs. 115, 116). The copulatory canals form two broad loops, the second of them, leading to the spermatheca, differs from the first by having strongly sclerotized walls. The passage from the less sclerotized into the stronger sclerotized part of the canal is abrupt and distinct (figs. 48, 117). The spermathecae have an elongated but relatively simple distal part, the openings of the accessory glands are quite distinct (figs. 62, 118). The internal surface of the spermathecae is covered with teeth.

Sternum brown or black, with long and fine grey hairs and with white scales. Coxae white-yellowish, covered with white-grey setae and, very sparsely, with indistinct white scales. Maxillary plates and labium light fawn, bordered with white. Chelicerae light fawn, their anterior surface near the basal end somewhat darker, covered with white scales. Typical with a minute tooth on their anterior internal margin.

Legs light yellow with a delicate fawn shade, covered with white scales and with white and black setae. Spines present. There are dark grey spots, of various sizes and intensities of colour on the lateral surfaces of femora, patellae and tibiae. In some specimens the distal ends of the segments are darkened, this character, however, varies greatly. Claws, scopulae and tarsal tufts typical. Length of segments of legs: I 0.45–0.36 (0.38) + 0.36–0.27 (0.33) + 0.48–0.42 (0.46) + 0.54–0.45 (0.50) + 0.90–0.72 (0.78), II 0.39–0.33 (0.35) + 0.30–0.27 (0.28) + 0.42–0.33 (0.38) + 0.45–0.39 (0.41) + 0.72–0.60 (0.65), III 0.45–0.36 (0.38) + 0.42–0.33 (0.38) + 0.42–0.33 (0.38) + 0.49–0.36 (0.39) + 0.75–0.66 (0.70), IV 0.48–0.42 (0.45) + 0.63–0.51 (0.55) + 0.75–0.57 (0.67) + 0.69–0.60 (0.64) + 1.35–0.84 (1.20). Ratio *d* 2.1–1.6 (1.8).



Figs. 115-118. *Yllenus mongolicus* sp. n. — ♀, copulatory organs: 115-116 — epigynum of two different specimens, 117 — epigynum after maceration, 118 — spermatheca, dorsal view.



Figs. 119-120. *Yllenus elegans* (KRON.) — ♂, copulatory organ, lateral view (after KRONBERG): 119 — inner surface, 120 — outer surface.

Yllenus elegans (KRONEBERG, 1875)

Synonym: *Attus elegans* KRONEBERG, 1875.

The type is the only known specimen; and it should be kept together with other material of the FEDČENKO Expedition in the Zoological Museum in Moscow. Unfortunately this specimen has not been found there, although the types of other species from that collection have been lent to me for examination.

Although the original drawings of KRONEBERG are exceedingly good (figs. 119, 120), they do not permit us to distinguish this species from related ones and nothing certain can be said about its systematic position. Undoubtedly, however, this species belongs to the *hamifer* group and is closely related to *Y. hamifer* SIMON itself.

Part II. The *albocinctus* group

The *albocinctus* group contains species characterized in the males by a short cymbium, stylus, and short and slender conductor; the bulbus is relatively large. The articulating apparatus consists of complicated processes on the cymbium and tibia.

The epigynum of the female in this group is relatively strongly sclerotized, the copulatory canals are straight or form simple loops and are strongly sclerotized.

Yllenus salsicola (SIMON, 1937)

Synonym: *Attulus salsicola* SIMON, 1937.

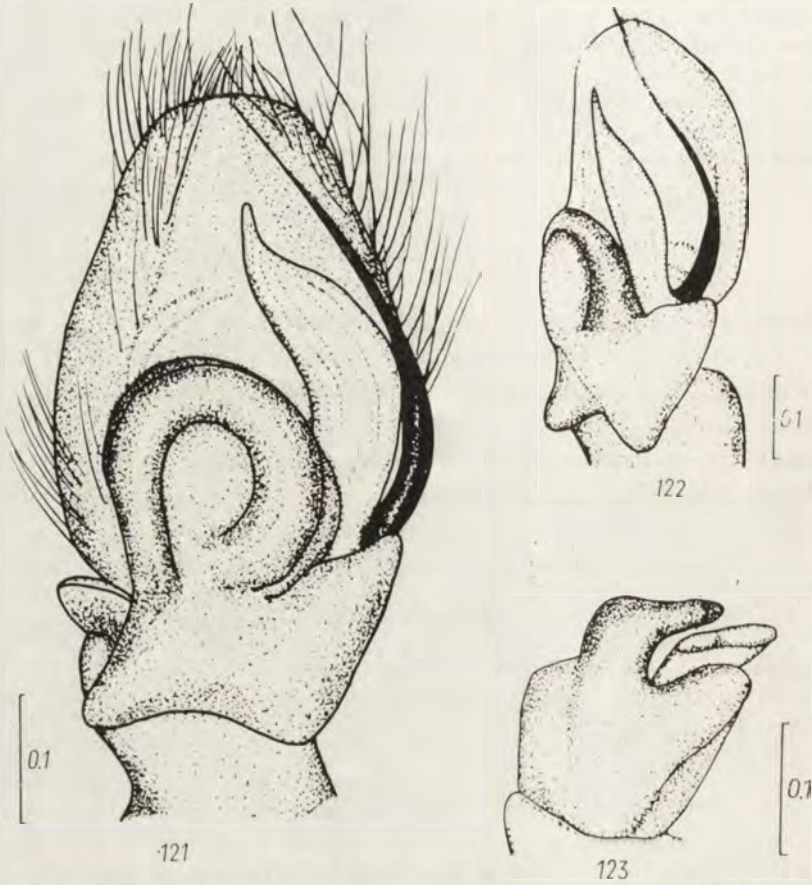
Material: "24415" (?) "*Attulus salsicola* E. S. Gruissan ..." (the label is partly illegible) — 2 ♂♂, 1 ♀ (probably syntypes) (MNHN-Paris).

Description of male

Cephalothorax brown, lateral and anterior margins of the cephalothorax black. Eye field covered with white scales, together with a few grey ones on one of the specimens. Thorax and lateral surfaces of the cephalothorax are covered with broad white scales. Ventral edge of carapace covered densely with white scales — but these are less conspicuous in one of the specimens studied. Eyes I surrounded by elongated white scales. There are a few stout bristles remaining from the row of bristles above eyes I. Length of cephalothorax 1.71–1.62, length of eye field 0.76 (both spec.), width of eye field I 1.22–1.17, width of eye field III 1.44–1.40. Ratios: *a* 0.44–0.47, *b* 0.85–0.84, *c* 0.62–0.65.

Abdomen dorsally covered with white scales, with a median longitudinal stripe of mixed brown and white scales. The abdomen of the second specimen is now bald with traces of a similar pattern. Abdomen ventrally whitish-grey, covered with white scales. Lateral surfaces somewhat darker. Length of abdomen 1.53–1.76.

Sternum yellowish-fawn with a brown margin, covered sparsely with fine white setae. Coxae yellowish-olive-fawn, covered with white setae and scales. Chelicerae dark brown, typical.



Figs. 121–123. *Yllenus salsicola* (SIM.) — ♂, right copulatory organ: 121 — ventral view, 122 — latero-ventral view, 123 — articulating apparatus.

Pedipalps (figs. 15, 121, 122). Cymbium long, robust and quite broad. The breadth of the tip of the cymbium at its end is equal to half of the breadth of the cymbium at its broadest part. Bulbus large with its posterior part somewhat larger than the anterior part. Conductor and stylus inserted half way down the lateral surface of the bulbus. The conductor is a flat and elongated falciform plate, equal in length to the bulbus. Stylus elongated and bent. Hook-like tibial apophysis long and so strongly bent that its distal part is parallel to the distal margin of the tibia. Between this apophysis and the margin there is a large diagonal groove housing the bent flattened apophysis of the cymbium (figs. 24, 123). Judging from their structure the function of these apophyses

is articulation and delimitation the movements of both segments of the pedipalp.

Legs yellowish-fawn with a greyish shade, covered with white setae and scales; spines present. Tibia I dark brown with a dense "brush" of black setae on the ventral surface, among which are a few black scales. This character on the second specimen is much less distinct. Tibia I, although brown, is somewhat paler, the "brush" of black setae is less dense and there are no black scales. Scopulae on tarsi I-II, clusters of setae on tarsi III-IV, and claws (toothless) typical. Length of segments of legs: I 0.48-0.42+0.45-0.39+0.66-0.63+0.69-0.60+1.08-1.02, II 0.42-0.36+0.36-0.36+0.48-0.48+0.54-0.54+0.84-0.78, III 0.48-0.39+0.42-0.42+0.42-0.36+0.48-0.42+0.81-0.66, IV 0.48-0.36+0.60-0.54+0.78-0.72+0.78-0.78+1.53-1.44. Ratio d 1.8-2.0.

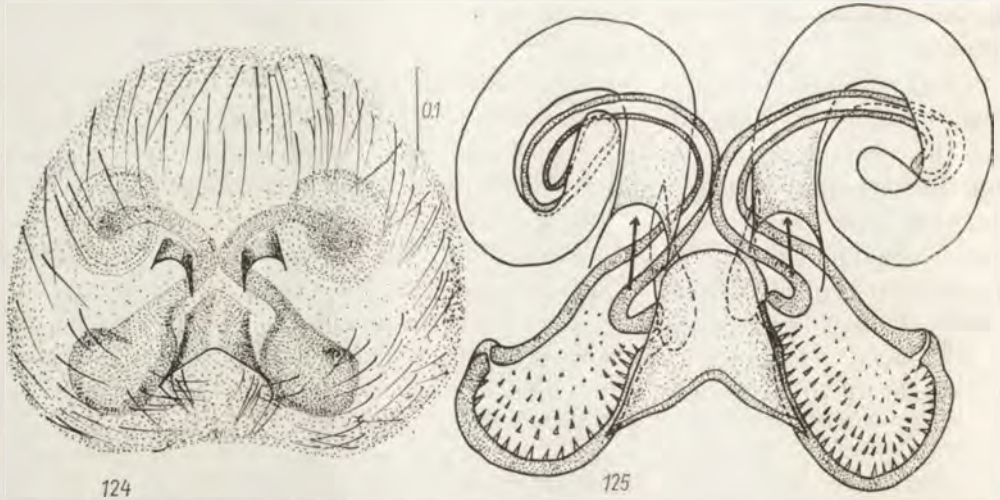
Description of female

Cephalothorax brown with the area round eyes III dark brown; lateral surfaces light fawn. Eye field and lateral surfaces covered with white scales. The thorax of the specimen studied are now bald. Ventral edge of the carapace covered with white scales. There is a "beard" of white scales on the clypeus. Length of cephalothorax 1.89, length of eye field 0.90, width of eye field I, 1.40, width of eye field III 1.62. Ratios: a 0.47, b 0.86, c 0.64.

Abdomen dorsally cream-grey with a fawn shade with a central longitudinal brown stripe fragmented in the posterior part of the abdomen into separate transverse brown stripes. The whole abdomen covered uniformly with whitish, semitransparent scales. Abdomen ventrally whitish-grey, covered with whitish scales. Length of abdomen 2.80.

Epigynum (fig. 124) oval, elongated transversely. The sclerotized elements are: the roof over the vagina and the roofs over the copulatory openings. The ridge between the copulatory openings is not elevated. To the side of each copulatory opening there is a stronger sclerotized circular plate, concave in the centre, resembling the copulatory opening and its surroundings so closely that it may easily be mistaken for it. These "false openings" lie dorsal to, and correspond with, the junction of the strongly and the weakly sclerotized parts of the copulatory canal. The sclerotized canals and spermathecae are fairly clearly visible through the semitransparent epigynum.

The copulatory canals (figs. 49, 125) form two broad loops. The proximal part of the canal (near the copulatory opening) is weakly sclerotized but passes abruptly into the distal part (near the spermatheca) which is strongly sclerotized. The distal parts of the spermathecae (fig. 64) are short and turned anteriorwards. The internal walls of the spermathecae are covered with spines. The opening of the accessory gland resembles a narrow canal; the walls of the spermathecae are thickened around this canal and form a distinct protuberance.



Figs. 124–125. *Yllenus salsicola* (SIM.) — ♀, copulatory organ: 124 — epigynum, 125 — epigynum after maceration.

Sternum yellowish-fawnish-grey surrounded with brown, covered with long white setae. Maxillae fawn with white tips. Labium brown with white tip. Chelicerae brown, typical.

Legs. Tarsi, metatarsi and tibiae I–IV fawn, patellae and femora I–IV lemon-yellow. Covered with white scales and setae, with the addition of a few brown setae. Spines present. Unlike in the male, tibia I, although quite massive, is not darker than the other segments. Claws typical, without teeth, scopulae and tarsal tufts typical. Length of segments of legs: I $0.48 + 0.36 + 0.60 + 0.84 + 1.08$, II $0.48 + 0.36 + 0.48 + 0.66 + 0.96$, III $0.48 + 0.48 + 0.45 + 0.48 + 0.84$, IV $0.56 + 0.66 + 0.96 + 0.96 + 1.71$. Ratio d 2.0.

Yllenus albifrons (LUCAS, 1846)

Synonyms: *Salticus albifrons* LUCAS, 1846.

Attus albifrons: SIMON, 1868.

Attulus albifrons: SIMON, 1889.

Material: SE Libya, El Kufra Highland, VII. 1931, GIALO leg. — 1 ♀ (MCSN-Genova).

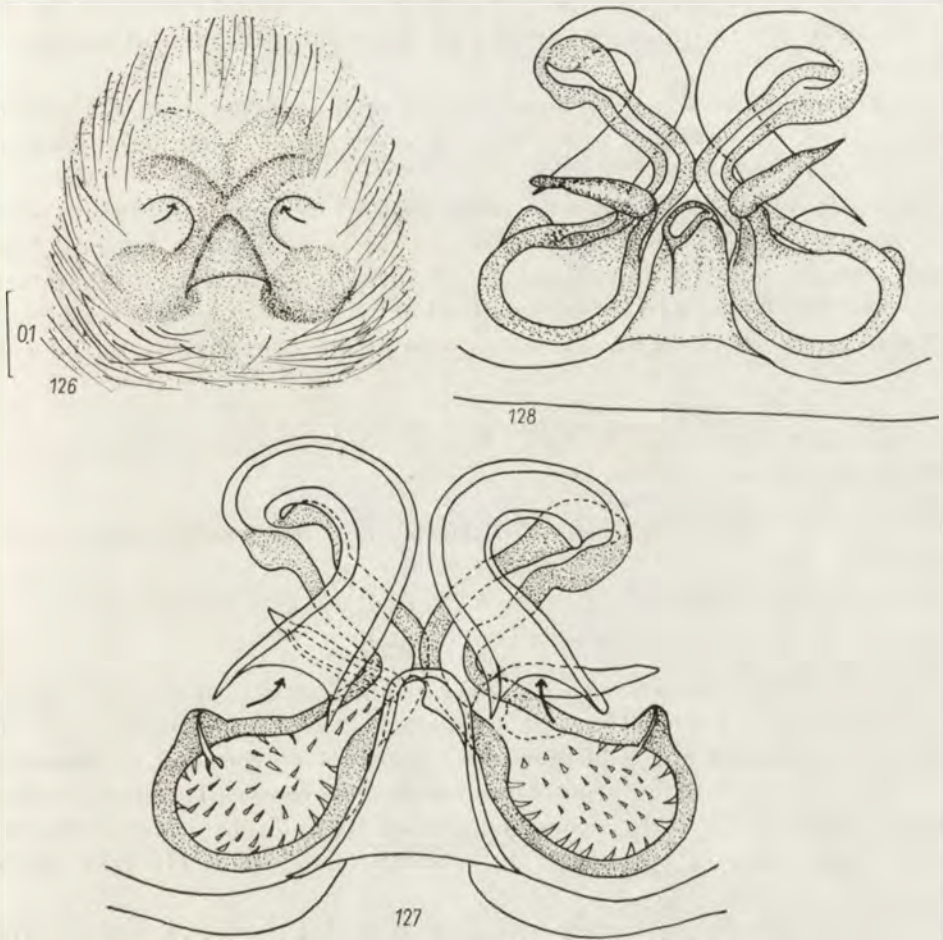
Remarks. My conclusions are based on examination of this single specimen identified by DI CAPORACCO. I could not find the type specimens nor any other specimens identified by LUCAS himself, so my conclusion about the systematic position of this species depends on the accuracy of DI CAPORACCO's identification. At any rate the specimen I have seen is certainly a *Yllenus* and is distinct from other species of this genus.

Description of female

Cephalothorax dark yellow with black spots near eyes II and III. Eye field covered with white scales, with the addition of a few stout black bristles. Thorax now bald. No traces of any colour or setae pattern preserved. Length of

cephalothorax 1.82, length of eye field 0.84, width of eye field I 1.26, width of eye field III 1.44. Ratios: *a* 0.46, *b* 0.87, *c* 0.67.

Abdomen dorsally yellowish-grey, covered with very small and indistinct scales which can be seen only under 100 times magnification. Abdomen ventrally whitish-yellow. Length of abdomen 2.38.



Figs. 126–128. *Ylenus albifrons* (LUC.) — ♀, copulatory organ: 126 — epigynum, 127 — epigynum after maceration, ventral view, 128 — the same, dorsal view.

Epigynum quite similar to that of *Y. salsicola* (SIM.) from which it differs by the indistinct curvature of the vaginal roof border (fig. 126), the more posterior and lateral location of the copulatory openings, and by the lack of “false copulatory openings”. The copulatory canal forms a single loop in which the proximal part passes under the more distal (that is, leading to the spermatheca) part of the loop (figs. 50, 127, 128). The walls of the proximal part of the copulatory canal (close to the copulatory opening) are thicker and more sclero-

tized than in *Y. salsicola* SIM., none-the-less they pass abruptly into the even thicker and more heavily sclerotized distal part of the canal — the latter is of the same thickness as the walls of the spermatheca and resembles in shape the straight canals of *Y. albocinctus* (KRON.) and *Y. vittatus* THOR.

Spermathecae (figs. 65, 128) pear-shaped with a distinct protuberance through which runs the narrow canal of the accessory gland. Internal surface of the spermatheca covered with spines; its distal part short and straight and arising from its anterior part.

Sternum and coxae pale yellow, covered with long fine setae. Chelicerae brown, typical, with a small tooth above the sclerotized ridge on the anterior internal edge (fig. 74).

Legs pale yellow, covered with long, fine white setae and white scales. There are also some brown, somewhat thicker setae. Spines present. Claws typical without teeth, scopulae and tarsal tufts typical. Length of segments of legs: I $0.54 + 0.36 + 0.60 + 0.66 + 0.96$, II $0.54 + 0.36 + 0.48 + 0.54 + 0.90$, III $0.54 + 0.48 + 0.48 + 0.48 + 0.84$, IV $0.54 + 0.66 + 0.96 + 0.84 + 1.80$. Ratio d 1.8.

Yllenus squamifer (SIMON, 1881)

Synonyms: *Eris squamifer* SIMON, 1881.

Attulus squamifer: SIMON, 1901.

Material: — “*Attulus squamifer* E. S. Algaroc, ...” (label poorly legible) — 1 ♂, 1 ♀ (probably syntypes) (MNHN-Paris).

Description of male

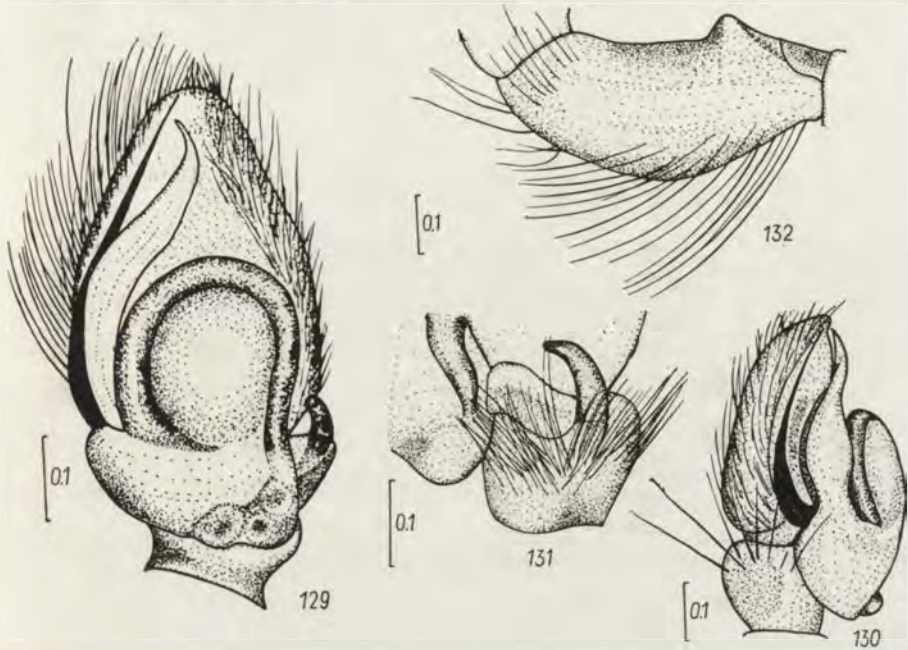
Cephalothorax brown with a copper gleam, margins of eye field darker, surrounding of eyes I and III black. Cephalothorax is bald now with a trace of white scales on the eye field and thorax. Eyes I surrounded by baton-like white scales, there are a few stout fawn bristles above eyes I. Lateral surfaces covered sparsely with white scales. Length of cephalothorax 1.58, length of eye field 0.76, width of eye field I 1.22, width of eye field III 1.39. Ratios: a 0.48, b 0.87, c 0.62.

Abdomen dorsally dark grey with a fawn shade; there is a darker, brown median longitudinal stripe. A few white scales present. Abdomen ventrally greyish-fawn with a whitish-yellow shade, covered with white scales. Length of abdomen 1.71.

Sternum brown with a darker, brownish-grey margin. Covered with long and fine white setae. Coxae olive-grey, the I and II ones slightly darker. Covered with short white setae and a small number of white scales. Maxillae and labium fawn with white tips. Chelicerae typical, fawnish-brown anteriorly, brown posteriorly.

Pedipalps (figs. 6, 14, 129–132). Copulatory organ resembles that of *Y. salsicola* (SIM.). The tip of the cymbium is somewhat narrowed but short. Bulbus

large with its anterior part almost twice as long as the posterior one. Conductor thin and longer than bulbus. Stylus long and thin. The cymbium apophysis is a broad, flat and bent semitransparent plate. Tibial apophysis (fig. 23) long, bent and hook-like. Femoral protuberance (fig. 37) small but distinct.



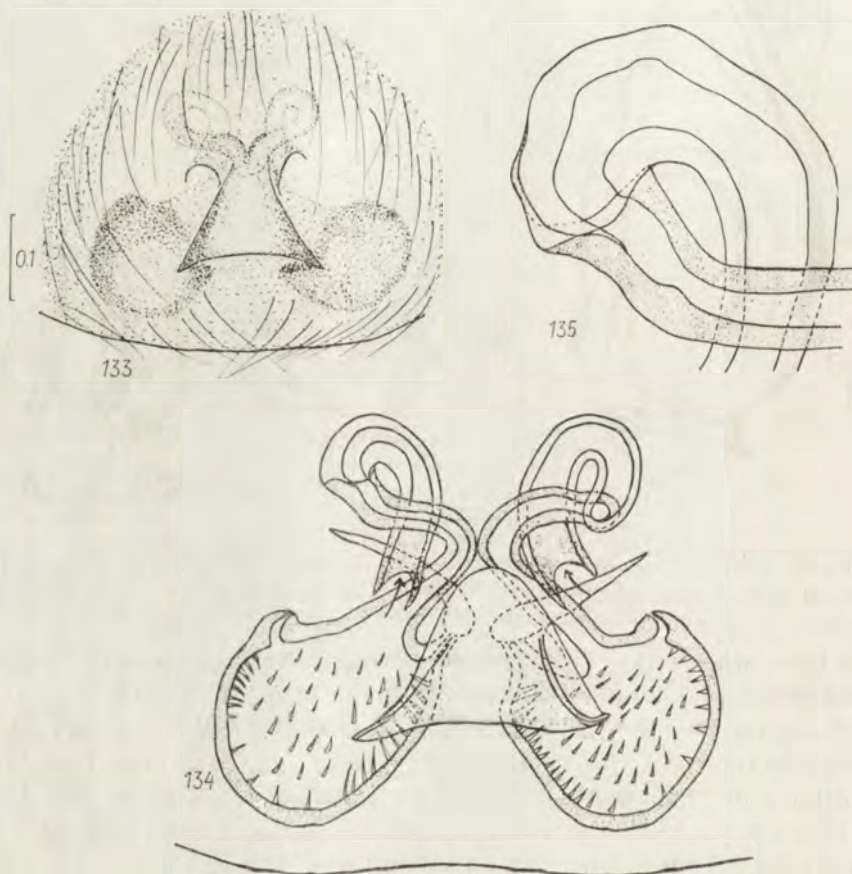
Figs. 129–132. *Yllenus squamifer* (SIM.) — ♂, left copulatory organ: 129 — ventral view, 130 — lateral view of inner surface, 131 — articulating apparatus, 132 — pedipalpal femur.

Legs fawn with darker spots, covered with white scales and more sparsely with long white setae. Spines present. Lateral surfaces of all segments dark brown, those on femora with two fawn oval spots. Tibia and metatarsus I brown with no trace of a “brush” of black setae on their ventral surfaces. On the dorsal surfaces of tibiae and patellae II–IV there are three longitudinal brown stripes. Claws typical without teeth, scopulae and tarsal tufts typical. Length of segments of legs: I $0.45 + 0.42 + 0.60 + 0.60 + 0.96$, II $0.42 + 0.30 + 0.42 + 0.48 + 0.78$, III $0.48 + 0.36 + 0.39 + 0.42 + 0.78$, IV $0.42 + 0.54 + 0.72 + 0.72 + 1.35$. Ratio d 1.8.

Description of female

Cephalothorax fawn-brown, with lateral margins of eye field black. Eye field covered with white scales sprinkled with orange ones. The distances between scales are sufficient to display their brown background — the general colour of the eye field is therefore fawn. There is no marked colour pattern. The scales in the posterior part of the eye field are thinner than the anterior

ones. Thorax now bald with remnants of white scales on the dorsal part and of white and orange ones on the lateral surfaces. Eyes I surrounded by white baton-like scales — orange ones above each eye and white ones on either side. In the male specimen these scales are exclusively white. There is a row of stout bristles above eyes I, and similar bristles are scattered over the sides of the cephalothorax. Length of cephalothorax 1.80, length of eye field 0.81, width of eye field I 1.40, width of eye field III 1.57. Ratios: a 0.45, b 0.89, c 0.58.



Figs. 133–135. *Yllenus squamifer* (SIM.) — ♀, copulatory organ: 133 — epigynum, 134 — epigynum after maceration, 135 — junction between strongly and weakly sclerotized parts of the copulatory canal.

Abdomen dorsally fawnish-brown with a grey shade, there is a darker indistinct median stripe along the abdomen. Covered sparsely with white scales and also with colourless scales which have darker median stripes. Abdomen ventrally pale fawn with a white shade, sides brownish-grey. Covered with white scales and setae. Length of abdomen 1.96.

Epigynum resembles that of *Y. salsicola* (SIM.), from which it differs by the large and broader vaginal roof, whose posterior border is much more shallowly curved (fig. 133). As in *Y. albifrons* (LUC.), the copulatory canal forms a single loop with distal part (close to the spermatheca) similarly sclerotized. However, the distal part runs underneath the proximal one, unlike in *Y. albifrons* (LUC.). The breadth of the soft-walled proximal part in *Y. squamifer* (SIM.) is distinctly smaller than in *Y. albifrons* (LUC.) (fig. 134). The junction of the proximal and the distal parts of the canal is very distinct (fig. 135). The spermathecae are larger and their walls thinner; the protuberance around the opening of the accessory gland is lower, and the canal of this gland is broader. The internal surfaces of the spermathecae are covered with spines; the distal part of the spermatheca is very short and its location distinctly different from that in the two previously described species (figs. 63, 134).

Sternum fawn with a brownish-grey margin, covered with long and thin white setae. Coxae I and II yellowish-fawn, III-IV yellow, covered with fine white setae, there are also indistinct scales on coxa I. Maxillae fawn with white tips. Labium brown with white tip.

Legs fawn with darker, greyish-fawn lateral surfaces, covered with white scales and setae, spines present. Femora I-III with two paler oval spots on lateral surfaces. Leg I has a more massive appearance and is darker brown, but there are no traces of a black "brush" of setae on tibia I. Claws typical without teeth. Scopulae and tarsal tufts typical. Length of segments of legs: I $0.48 + 0.36 + 0.60 + 0.72 + 1.02$, II $0.48 + 0.36 + 0.48 + 0.60 + 0.90$, III $0.48 + 0.48 + 0.48 + 0.48 + 0.90$, IV $0.48 + 0.66 + 0.84 + 0.90 + 1.62$. Ratio d 1.8.

Yllenus albocinctus (KRONEBERG, 1875)

Synonyms: *Attus albocinctus* KRONEBERG, 1875.

Attulus albocinctus: SIMON, 1889.

Material: a) "*Attus albocinctus* sp. n. Samarkand, FEDČENKO. Ta-1043" — 1 ♂, 1 ♀, 1 juv. (syntypes) (ZM-Moscow); b) "532 *Attulus albocinctus* CRONEB., Armenia, KULCZYŃSKI. G. W. & E. G. PECKHAM" — 1 ♀ (MCZ-Harvard); c) "*Yllenus albocinctus*, Aralich" — 3 ♀♀ (coll. W. KULCZYŃSKI, I. Z. PAN-Warszawa).

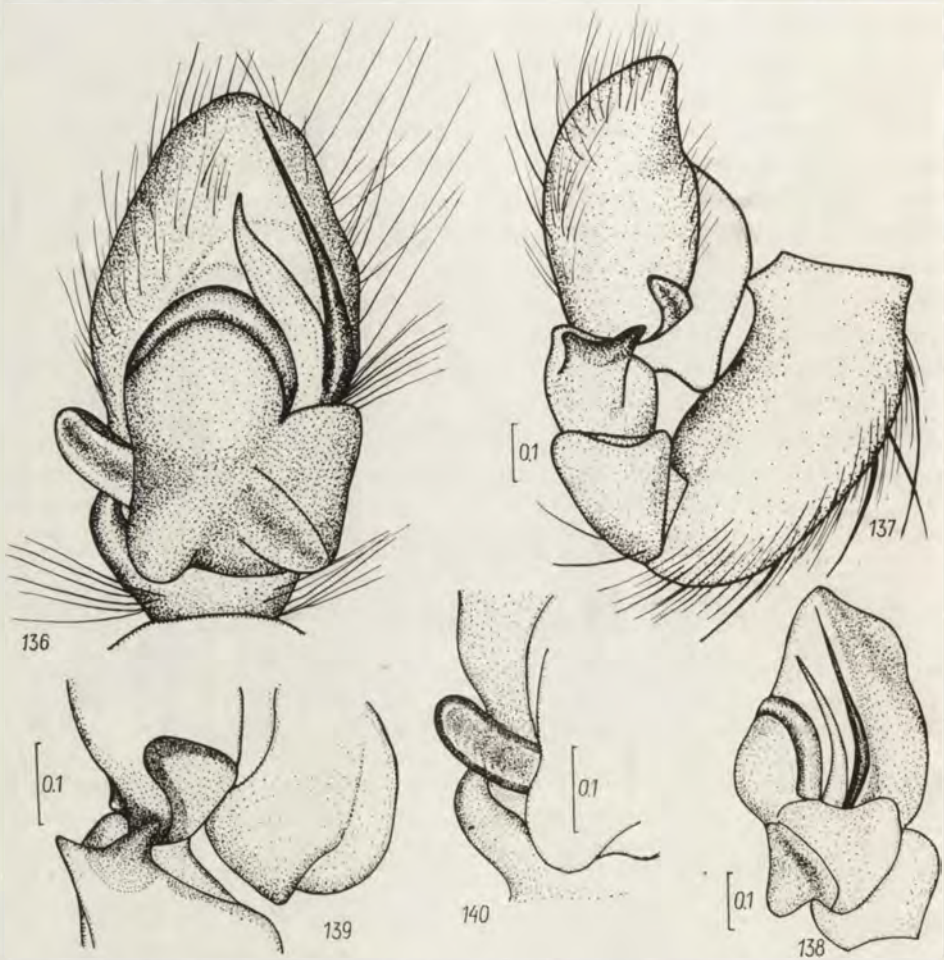
Remarks: The juvenile syntype specimen has a distinct colour pattern on the cephalothorax — resembling closely that given by KRONEBERG in his paper (KRONEBERG, 1875). However, the adult specimens studied have no such pattern.

Description of male

Cephalothorax brown with margins of eye field black. Eye field covered with white scales sprinkled with grey ones. No colour pattern except a few brighter white scales on the anterior and lateral margins of the eye field and behind eyes III. Thorax now bald with traces of white scales but no colour pattern. Lateral sides of cephalothorax covered sparsely with white scales. There is a row of stout white and a few fawn bristles. Length of cephalothorax

1.96, length of eye field 0.90, width of eye field I 1.30, width of eye field III 1.48. Ratios: a 0.46, b 0.87, c 0.65.

Abdomen dorsally fawnish-brown, covered with white scales — the final appearance being fawnish-grey. There are two transverse white belts, consisting of larger and more intensely white scales located on the unpigmented whitish belts on the abdomen. The width of the first belt is equal to $\frac{1}{7}$ th of the length of the abdomen and it is located immediately behind the grey anterior margin.



Figs. 136-140. *Yllenus albocinctus* (KRON.) — ♂, right copulatory organ: 136 — ventral view, 137 — lateral view of outer surface, 138 — ventro-lateral view, 139 — articulating apparatus, lateral view, 140 — the same, latero-ventral view.

The second belt, of the same width, is half way down the abdomen. Abdomen ventrally fawnish-grey, becoming yellowish near the lateral surfaces. Length of abdomen 1.76.

Sternum fawnish-brown, with darker margins, covered with long and fine white setae. Maxillae and labium fawnish-brown with somewhat paler tips. Chelicerae typical.

Pedipalps. The copulatory organ is similar to that of *Y. squamifer* (SIM.). Bulbus larger with a distinct notch from which arise both conductor and stylus. Stylus thinner than in the last species with its length equal to about $\frac{2}{3}$ rds that of the bulbus. (figs. 136–138). The cymbium apophysis is bent backwards and articulates with the conical ventral part of the tibial apophysis (figs. 25, 139, 140). When seen from the ventral side (fig. 138), the cymbium apophysis appears as a concave sclerotized plate, rounded at the end; whilst the tibial apophysis resembles a long and curved hook. Femoral protuberance low but distinct (fig. 38).

Legs fawnish-greyish-brown, covered with white scales and setae. Leg I is somewhat paler-fawnish-grey. Tibia I is more massive than the other segments and has a dense "brush" of thick fawnish-brown setae on its ventral side. Tibia II somewhat darker than the other segments. Claws typical, scopulae and tarsal tufts typical. Length of segments of legs: I $0.51+0.51+0.69+0.69+1.11$, II $0.48+0.45+0.51+0.60+0.93$, III $0.54+0.57+0.54+0.60+1.14$, IV $0.69+0.66+0.72+0.66+1.40$. Ratio d 1.3.

Description of female

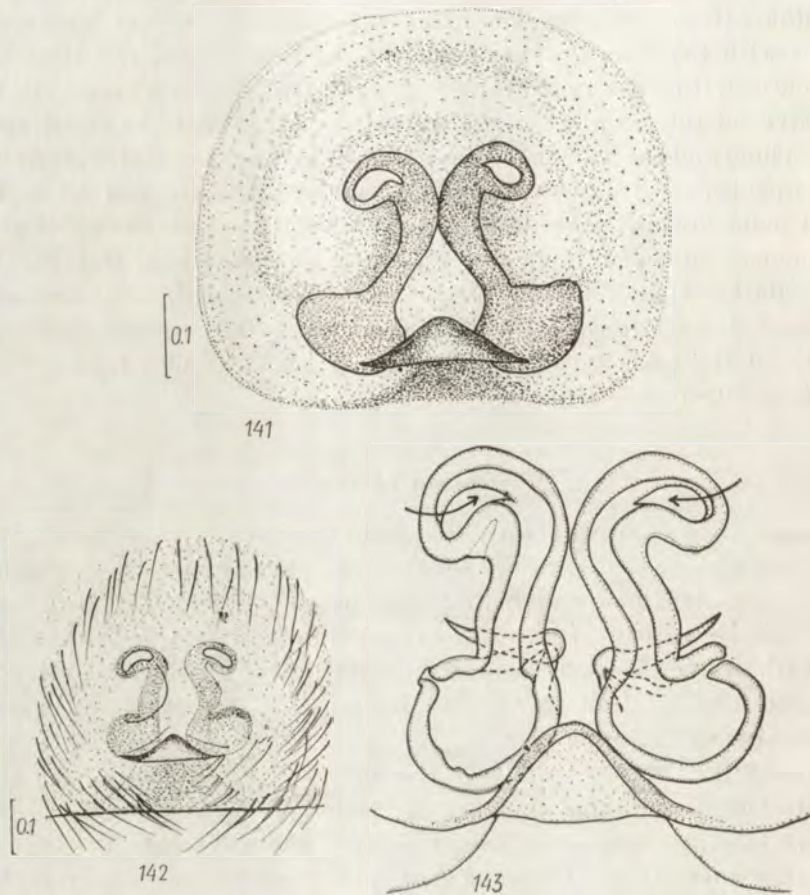
Cephalothorax brown, with eye field margins almost black, covered uniformly with white scales. Scales on the eye field are somewhat smaller than the other scales. Eyes I surrounded by white baton-like scales above which there are a few stouter bristles. Length of cephalothorax (five specimens) 2.24–1.89 (2.02), length of eye field 1.02–0.90 (0.95), width of eye field I 1.44–1.22 (1.36), width of eye field III 1.62–1.49 (1.57). Ratios: a 0.52–0.42 (0.48), b 0.88–0.82 (0.86), c 0.74–0.64 (0.70).

Abdomen dorsally partly macerated now, with slight traces of two transverse white belts resembling those of the male. Whole abdomen covered with uniform white scales and a few larger setae. Abdomen ventrally creamy-grey with two grey lines running from the epigynum down to the spinnerets. Covered with whitish scales. Length of abdomen 2.52–2.38 (2.48).

Epigynum. Very small, vaginal roof forming a broad low triangle. Margins of the copulatory openings sclerotized more strongly than in the last species. In all the specimens studied the copulatory canals are clearly visible through the semitransparent wall of the epigynum (figs. 52, 141, 142). Copulatory canals short, broad with thick strongly sclerotized walls. Spermathecae spherical, relatively simple, without spines on their inner walls. Openings of the accessory glands not distinct. Distal parts of spermathecae small and straight (figs. 66, 143).

Sternum fawn with darker margin, covered with long and fine white setae. Coxae fawnish-yellow, covered with white setae. Maxillae and labium fawn with white tips. Chelicerae brown, typical.

Legs yellowish-fawn, covered with white scales and setae, spines present. Leg I darker than other legs with tibia I somewhat more massive than the other segments but without any "brush" of setae on its ventral surface. Scopula on tarsus I short and apparently worn, there are only traces of scopula II visible.



Figs. 141–143. *Yllenus albocinctus* (KRON.) – ♀, copulatory organ: 141 – syntype – epigynum, 142 – KULCZYŃSKI'S specimen – epigynum, 143 – the same, after maceration.

Tarsal tufts III and IV typical, claws typical with indistinct teeth. Length of segments of legs: I 0.54–0.48 (0.52)+0.48–0.42 (0.46)+0.72–0.63 (0.67)+0.84–0.78 (0.81)+1.44–1.02 (1.12), II 0.63–0.48 (0.55)+0.48–0.40 (0.45)+0.60–0.51 (0.56)+0.72–0.60 (0.66)+1.02–0.90 (0.97), III 0.72–0.66 (0.64)+0.75–0.54 (0.60)+0.60–0.51 (0.56)+0.72–0.60 (0.66)+1.26–1.05 (1.19), IV 0.78–0.66 (0.70)+0.84–0.69 (0.74)+0.84–0.75 (0.80)+0.96–0.75 (0.85) +1.66–1.35(1.54). Ratio d 1.5–1.4 (1.46).

Yllenus univittatus (SIMON, 1871)

Synonyms: *Attus univittatus* SIMON, 1871.

Attulus univittatus: SIMON, 1889.

Pseudomogrus univittatus: SIMON, 1937.

Material: "788. *Attulus univittatus* E. S. Gallia" — 1 ♂, 4 ♀♀, 1 juv. (coll. E. SIMON, MNHN-Paris).

Description of male

Cephalothorax dark brown, margins of eye field almost black. Eye field covered with white scales sprinkled with a few fawn ones. These fawn scales are more abundant near eyes I median, where they form two triangular spots with their bases touching the anterior margin of the eye field. Eyes I surrounded by white baton-like scales. There is a row of stout brownish-fawn bristles above eyes I.

Dorsal surface of the thorax bald with a few elongated white scales remaining. Lateral surface of the cephalothorax covered sparsely with similar white scales. Ventral edge of carapace covered densely with white scales. Length of cephalothorax 1.89, length of eye field 0.93, width of eye field I 1.26, width of eye field III 1.40. Ratios: *a* 0.49, *b* 0.90, *c* 0.73.

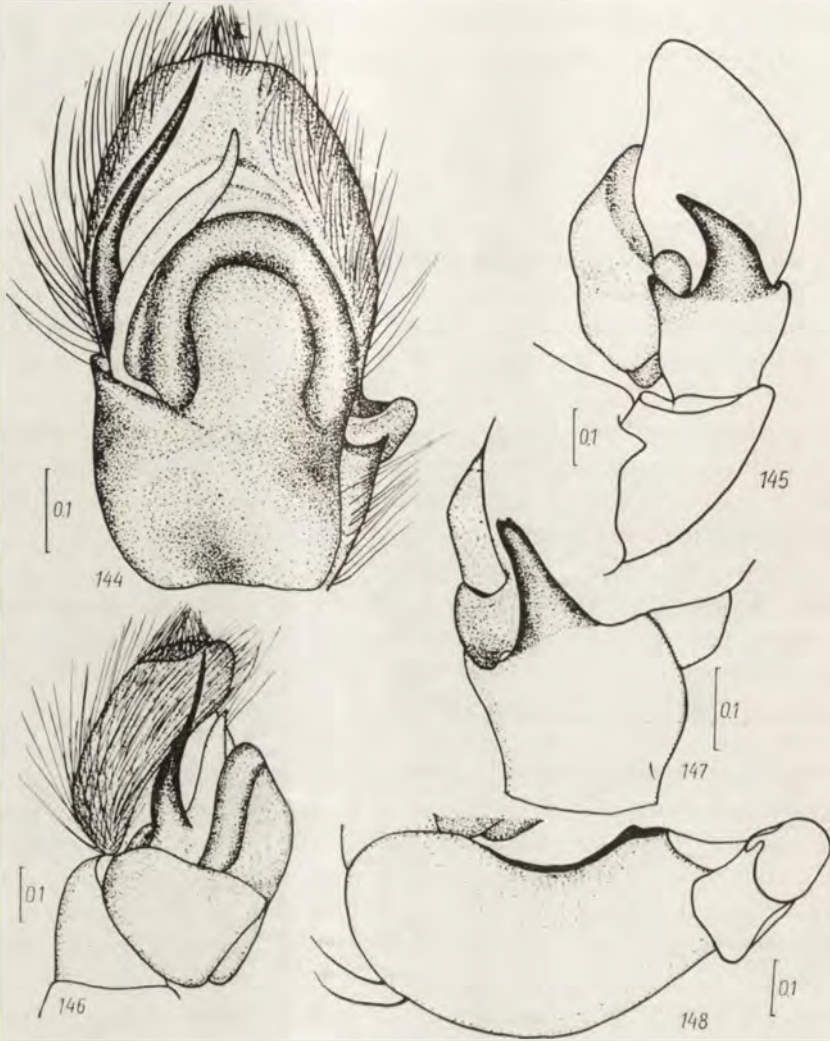
Abdomen dorsally covered densely with large, elongated and sharply pointed white scales. Median longitudinal darker stripe present, narrowing anteriorly and posteriorly. This stripe is covered with grey scales with indistinct brown longitudinal streaks. Lateral surfaces white. Abdomen ventrally covered densely with large and distinct white scales. Spinnerets pale fawnish-grey, covered with short brown setae. Length of abdomen 1.71.

Sternum pale fawn with either brown or dark grey margins covered with fine and long white setae. Coxae pale fawn, covered with white setae and white scales. Maxillae and labium fawnish-brown with white tips. Chelicerae dark brown, typical. The end of the sclerotized ridge protrudes over the bent anterior internal edge of the chelicera forming a small tooth.

Pedipalps. Copulatory organ similar in its general outline to that of the last species. Cymbium broad and not much narrowed at its tip. Bulbus broad and massive, with its posterior part shorter than its anterior one. Stylus relatively long, conductor slender (figs. 7, 16, 144–146). The cymbium apophysis is plate-like with extended angles, and it articulates with a slim, hook-like tibial apophysis (figs. 31, 147). Femoral protuberance in the form of a sclerotized ridge stretching along the ventral surface of the segment (figs. 40, 148).

Legs I–II fawnish-brown, III–IV yellowish-greyish-brown. Tibia I brown, darker and more massive but otherwise similar to the other segments. Legs covered with white scales and white and brown setae; spines present. Claws typical with very distinct teeth — claws IV for instance has six large teeth.

Scopulae and tarsal tufts typical. Length of segments of legs: I $0.60+0.45+0.72+0.84+1.26$, II $0.54+0.39+0.69+0.72+1.08$, III $0.60+0.57+0.54+0.63+1.17$, IV $0.66+0.78+0.84+0.81+1.66$. Ratio d 1.5.



Figs. 144–148. *Yttenus univittatus* (SIM.) — ♂, right copulatory organ: 144 — ventral view, 145 — lateral view of outer surface, 146 — the same, inner surface, 147 — articulating apparatus, 148 — pedipalpal femur.

Description of female

Cephalothorax. In the specimens studied the colouration of the cephalothorax varies from pale fawn to dark brown. The surroundings of the lateral eyes is usually almost black. Eye field covered with white, orange and grey scales making together the following pattern: a darker median longitudinal

stripe from the posterior margin of the cephalothorax runs to the centre of the eye field and ends in a point at the level of eyes II. The stripe consists of grey scales with a few orange ones. Around the anterior part there are also white scales with a few scattered orange ones. The orange scales on the eye field, if present, are arranged in indistinct diagonal lines (visible on three out of four specimens). All these lines originate near eyes I median, and stretch up to the eyes II or III. They may be interrupted and the intensity of their colouration varies.

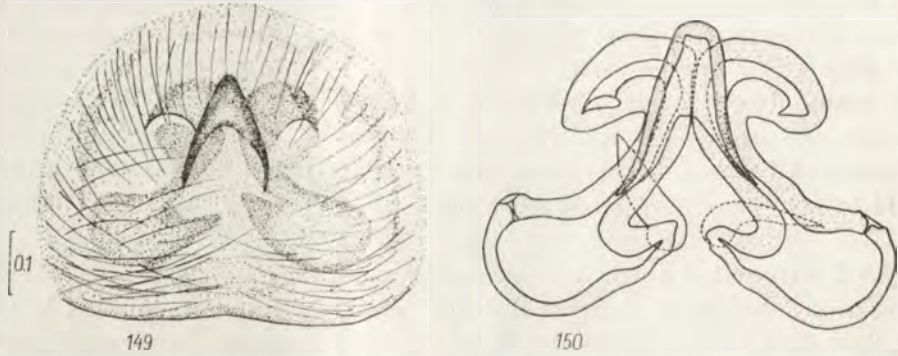
Eyes I surrounded with white baton-like scales and with a row of long brown bristles above. Scales on the thorax white and quite long, resembling flattened setae. The darker stripe on the thorax consists of sparsely distributed grey and orange elongated scales and also long and thick black setae. Similar black setae are scattered over the eye field and concentrated below the lateral margins of the eye field. The grey stripe on the thorax is bordered with white setae. Ventral edge of the carapace covered densely with white scales. Length of cephalothorax (four specimens) 2.45–2.10 (2.21), length of eye field 1.11–0.96 (1.04), width of eye field I 1.57–1.31 (1.44), width of the eye field III 1.76–1.53 (1.61). Ratios: *a* 0.46–0.44 (0.45), *b* 0.89–0.85 (0.87), *c* 0.75–0.70 (0.72).

Abdomen dorsally creamy-white with a dark brown or reddish-gold longitudinal median stripe. The margins of this stripe are serrated with about 7 teeth on each side. Abdomen covered with white scales, on the darker stripe there are fawnish-grey scales with a brown median streak. There are black bristles scattered over the whole abdomen. Spinnerets creamy-yellow, covered with brown setae. Abdomen ventrally whitish with creamy-yellow or grey shade. Length of abdomen 3.68–2.80 (3.26).

Epigynum similar to that of other species of this group already mentioned but it can be distinguished by the shape and position of the vaginal roof. This is located far anteriorly and is deeply curved in, resembling in its general outline a narrow pointed triangle with a deeply and inwardly curved base. The border of the anterior parts of the copulatory openings are strongly sclerotized (fig. 149). Copulatory canals resemble those of *Y. albocinctus* (KRON.), but their walls are thicker and their proximal parts (closer to the copulatory openings) are more strongly bent (fig. 53). Spermathecae without spines on their internal surfaces, but with long and straight distal parts. Openings of accessory glands funnel-like, narrowing inwardly (figs. 68, 150).

Sternum pale fawnish-yellow with dark grey margin, covered with long and fine white setae. Coxae pale fawnish-yellow, covered with white setae. There are sparse and inconspicuous white scales on coxae I and II. Maxillae fawn with white tips. Labium brown. Chelicerae dark brown, typical with a very small tooth on the anterior inner margin.

Legs yellowish-fawn, the lateral surfaces of the segments with greyish spots of varying intensity, but lacking entirely on one specimen. Covered with white scales and white setae; on the dorsal surfaces there are also a few big



Figs. 149–150. *Yllenus univittatus* (SIM.) — ♀, copulatory organ: 149 — epigynum, 150 — epigynum after maceration.

brown setae. Tarsus, metatarsus, tibia and patella I are more fawn than the other segments. Tibia I is somewhat more massive but does not differ otherwise in colouration or setae covering. Claws typical with large and conspicuous teeth. Scopulae typical consisting of thick black setae with white tips. Tarsal tufts III and IV typical. Length of the segments of legs: I 0.78–0.66 (0.70)+0.54–0.42 (0.47)+0.87–0.69 (0.77)+1.08–0.84 (0.92)+1.53–1.20 (1.32), II 0.72–0.60 (0.67)+0.48–0.39 (0.43)+0.69–0.54 (0.62)+0.84–0.75 (0.78)+1.20–1.08 (1.15), III 0.75–0.60 (0.67)+0.69–0.57 (0.61)+0.66–0.57 (0.61)+0.84–0.63 (0.72)+1.40–1.22 (1.31), IV 0.87–0.78 (0.82)+0.96–0.81 (0.89)+1.08–0.90 (0.96)+1.08–0.84 (0.91)+1.89–1.71 (1.81). Ratio d 1.6–1.4 (1.5).

Yllenus validus (SIMON, 1889)

Synonym: *Attulus validus* SIMON, 1889.

Material: "9890. *Yll. validus* E. S. Reg. Transcaspiacae Russ." — 1 ♂ — probably holotype (MNHN-Paris).

Description of male

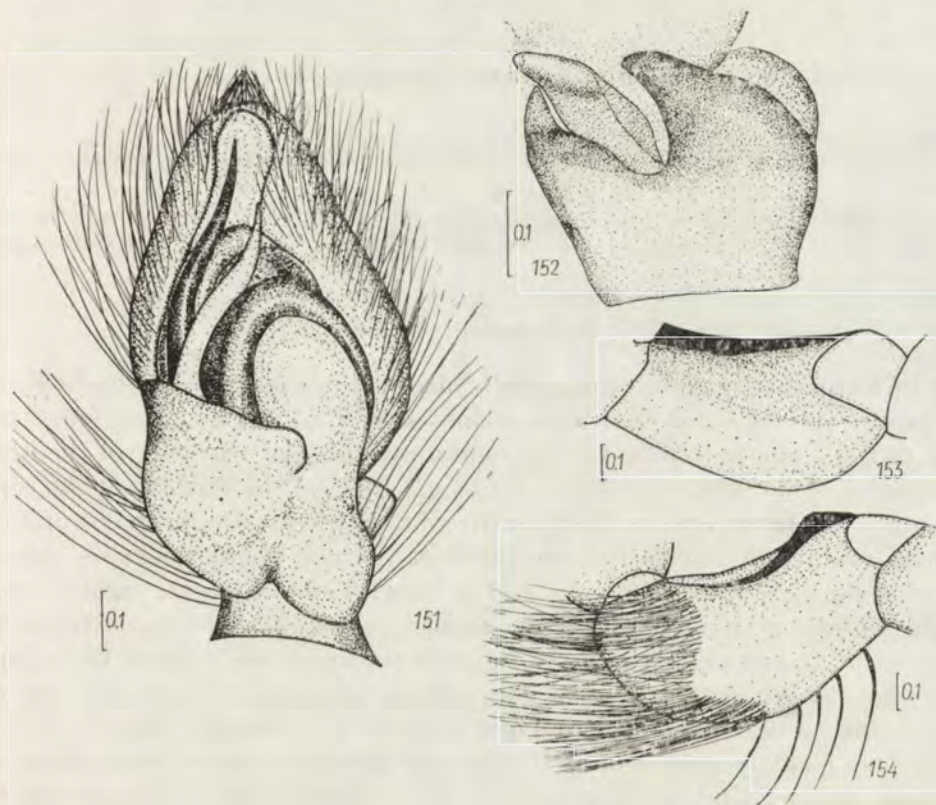
Cephalothorax brown, with lateral margins of eye field black. Covered with white scales (lacking now in some places). There are in addition a few golden-grey scales on the eye field where they form an inconspicuous pattern. Immediately behind eyes II there is an intensely white transverse line, separated from the remaining part of the eye field by a similar golden-grey line. In the posterior part of the eye field there is a trident-shaped mark pointed anteriorly. Its points end at the level of eyes II. Lateral surfaces of the cephalothorax covered sparsely with white scales, ventral edge of the carapace covered densely with white scales. There is a row of white and behind them a row of grey setae above eyes I. There is also a dense "beard" of white setae hanging from the clypeus in front of the basal parts of the chelicerae. Length of cephalothorax

2.73, length of eye field 1.26, width of eye field I 1.54, width of eye field III 1.96. Ratios: a 0.46, b 0.78, c 0.82.

Abdomen dorsally covered with white scales, with a reddish-brown median longitudinal stripe narrowing at either end. The margins of the stripes are smooth, without any serration and it is covered with golden scales. Spinnerets are yellowish-grey. Abdomen ventrally whitish-grey, covered with whitish scales. Length of abdomen 2.94.

Sternum fawnish-yellow, with slightly darker margin. Covered with long and fine white setae. Coxae I fawnish-brown, II-IV yellowish-fawn, covered with white setae. Maxillae and labium brownish-fawn with white tips. Chelicerae dark brown, typical, covered anteriorly with long white setae and a few white scales.

Pedipalps. General outline of the copulatory organ similar to that of *Y. univittatus* (SIM.), *Y. albocinctus* (LUC.) and *Y. squamifer* (SIM.) But the groove on the anterior ventrale surface of the cymbium in which lies the tip of the stylus, and the alveola of the cymbium are quite distinct. The length



Figs. 151-154. *Ylenus validus* (SIM.) — ♂, left copulatory organ: 151 — ventral view, 152 — articulating apparatus, 153 — pedipalpal femur, ventral view, 154 — the same, lateral view of inner surface.

of the posterior part of the bulbus is equal to that of the anterior. Conductor slender and short, slightly longer than half of the length of the bulbus. Stylus shorter than in the last species (fig. 151). Cymbium apophysis plate-like, articulating with a sclerotized depression on the distal edge of the tibia. On the dorsal side of this depression the tibia becomes massive, is bent ventrally, and forms a strongly sclerotized apophysis. There is another tooth-like apophysis, thin and fine, ventral to the depression (figs. 28, 152). Femoral protuberance, like that in *Y. univittatus* (SIM.) in the form of a thin sclerotized ridge. It stretches along the ventral surface of the segment (figs. 41, 153, 154).

Legs I and II — brownish-yellow, III and IV greyish-yellow, covered with long, whitish-grey setae and white scales. Tibia I quite massive, covered ventrally with whitish-grey setae sprinkled with brown ones. These brown setae do not, however, form a dense brush comparable with that of *Y. albocinctus* (SIM.). Claws typical with teeth, scopulae and tarsal tufts typical. Length of segments of legs: I 0.84+0.84+1.20+1.20+1.76, II 0.78+0.66+0.90+0.96+1.44, III 0.90+0.78+0.81+0.87+1.49, IV 0.90+1.02+1.17+1.08+2.17. Ratio *d* 1.4.

Ylenus vittatus THORELL, 1875

Synonym: *Attulus vittatus*: SIMON, 1889.

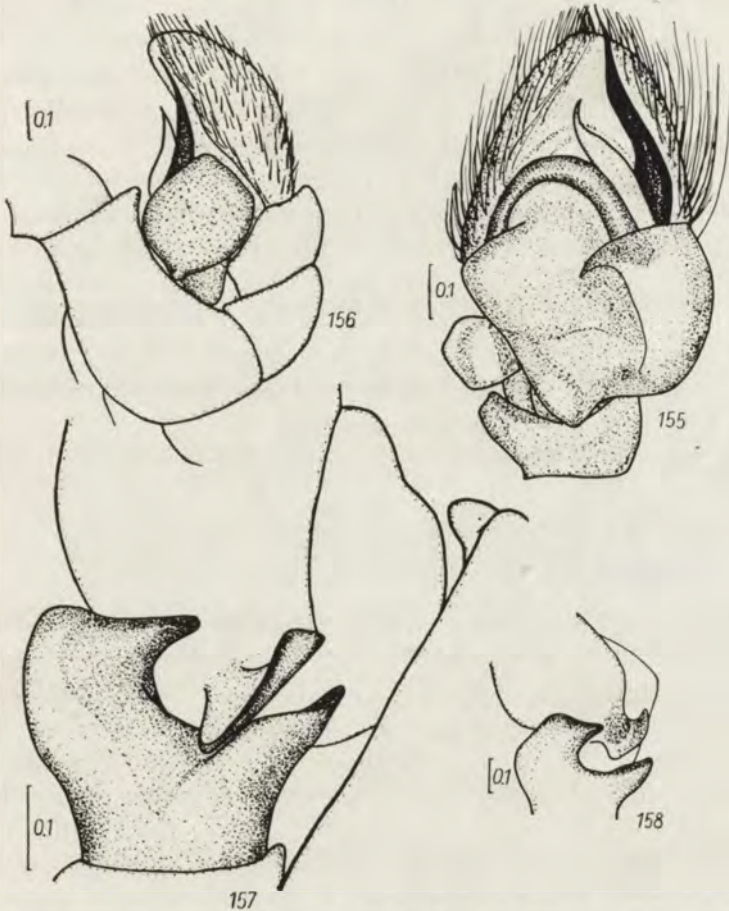
Material: a) "*Ylenus vittatus* THOR., Sarepta, 1861, A. BECKER No. 111 (Ent. etikett. n. 359)" — 1 ♂, 3 ♀♀ — syntypes (ZM-Helsinki); b) "*Attulus vittatus* THOR., Sarepta, (BECKER) No. 1693b" — 1 ♀, 1 separated palpus of the ♂ (most probably detached from the syntype male from the above mentioned collection from Helsinki) — syntypes (NHRM-Stockholm).

Description of male

Cephalothorax light brown, with surroundings of eyes I lateral and eyes III brown. Two longitudinal light stripes separated by a darker one stretch from the posterior margin of the eye field up to the posterior edge of the cephalothorax. The breadth of each stripe is equal to $\frac{1}{3}$ of the breadth of the cephalothorax. Eye field covered evenly with white scales, without traces of colour pattern of any sort. With the exception of the eye field, the scales covering the cephalothorax are elongated and narrow. Those covering lighter stripes on the thorax are denser and more intensely white. The darker stripe is now rather bald, the remaining parts of the cephalothorax are covered rather sparsely with smaller scales. Ventral edge of the carapace covered densely with broad white scales. Eyes I surrounded with white baton-like scales.

At this point the problem of the correct interpretation of the original description of THORELL, and of the characters visible on his specimens must be discussed. The above described specimens are most probably those on which THORELL based his description of *Y. vittatus*, but they do not display the most important feature mentioned by THORELL — namely the two distinct and

parallel longitudinal lines on the cephalothorax. I do not think it possible that THORELL could describe two broad white stripes as lines ("vitta" in the original latin description). However, two parallel white lines which fit THORELL'S description very well are found on the eye field of the Bulgarian specimens of *Y. horvathi* CHYZER (although, curiously, not on the Hungarian specimens of this species). But *Y. vittatus* THORELL and *Y. horvathi* CHYZER are certainly different species. Concerning the difference between the type specimens and the original description of *Y. vittatus* THORELL, I suspect that THORELL may have had together specimens of both species which he has not distinguished.



Figs. 155-158. *Yllenus vittatus* THOR. — ♂, right copulatory organ: 155 — ventral view, 156 — lateral view of inner surface, 157 — articulating apparatus, 158 — the same, antero-lateral view.

The specimens resembling the Bulgarian *Y. horvathi* CHYZER may have been subsequently destroyed or placed into other tubes — a mistake one often finds when dealing with old collections. Whether or not this is the true explanation

may never be known. As a practical solution I suggest that the specific name *Y. vittatus* THORELL should be retained for the syntypes redescribed here. If in the future the specimens marked with a double white line on the cephalothorax are discovered among THORELL'S material, they should be either considered as *Y. horvathi* CHYZER or, if they are different from that species, described under a new specific name.

Abdomen dorsally. Abdomen severely damaged, but there is a longitudinal greyish-brown stripe, covered with colourless scales with a dark median streak. On either side of this longitudinal stripe is a light stripe covered with elongated and fine white scales. Lateral surfaces with white and blackish-brown spots. Abdomen ventrally — completely damaged.

Sternum pale yellow with a fawn shade covered with white setae. Coxae I and II pale yellow with a fawn shade, III and IV — pale yellow. Maxillae and labium pale fawn with white tips. Chelicerae fawnish-brown, typical.

Pedipalps. Bulbus of the copulatory organ rather massive with its posterior part longer than the anterior one. The stylus and conductor arise more anteriorly than in the last species, approximately $\frac{1}{3}$ rd of the length of the bulbus. Conductor somewhat shorter; stylus, more massive, variable in outline and somewhat longer than in the last species (figs. 155, 156). Articulating apparatus resembles in general outline that of the last species but differs in shape and proportions (figs. 27, 157, 158). The femoral protuberance is quite high and does not form a sclerotized ridge (figs. 39, 156).

Legs pale fawn, with white scales and setae. Spines present. Many segments lacking. Measurements — could not be taken because of damage to the specimen.

Description of female

Cephalothorax brown with two long and pale longitudinal streaks on the thorax, separated by a broad brown stripe. Anteriorly to the brown stripe there is a triangular brown spot on the eye field at the level of eyes III. Eye field covered with white and orange scales. The scales on the triangular spot are grey and orange. This pattern is indistinct and barely visible. Scales covering thorax are more elongated and thinner than those on the eye field. A few brown bristles are scattered over the eye field. Eyes I surrounded by orange scales, except between eyes I median, where they are white. There is a row of long and dense brown bristles above eyes I. Lateral surfaces of cephalothorax pale fawn with a black ventral margin. Ventral edge of the carapace covered with white scales. Length of cephalothorax (four specimens) 2.52–2.03 (2.29), length of eye field 1.14–0.99 (1.05), width of eye field I 1.53–1.35 (1.44), width of eye field III 1.80–1.48 (1.66). Ratios: *a* 0.49–0.43 (0.46), *b* 0.91–0.85 (0.86), *c* 0.74–0.71 (0.72).

Abdomen dorsally. Soft tissues partly macerated and a large number of scales covering abdomen fallen out. Remaining scales indicate the existence

of a serrated longitudinal stripe, consisting of fawnish-grey scales with a golden gleam. The remaining part of the dorsal surface of the abdomen was covered with white scales, the lateral surfaces with grey scales. Brown bristles scattered over the dorsal surface. Abdomen ventrally pale grey, covered with white scales and setae. Length of abdomen 3.68–2.38 (3.23).



Figs. 159–160. *Yllenus vittatus* THOR. — ♀, copulatory organ: 159 — epigynum, 160 — epigynum after maceration.

Epigynum resembles that of *Y. univittatus* (SIM.), but differs by the much broader vaginal roof whose posterior margin is more broadly curved inwards. The posterior margins of the copulatory openings are strongly sclerotized in the form of broad horse-shoe-shaped plates. The central part of the epigynum is elevated. There is a broad semicircular groove in front of the epigynum (fig. 159). The surface of the epigynum posterior to the vagina is deeply depressed and the vaginal cavity itself is rather high. Copulatory canals resemble those in *Y. univittatus* (SIM.) but are not bent anteriorly and their lumen is somewhat broader (fig. 54). The proximal part of the spermatheca is bigger than in the previous species. Opening of accessory gland, funnel-shaped, its lumen becoming broader near the internal surface of the spermatheca. A few spines limited to the posterior wall of the distal part of the spermatheca. Distal parts of spermatheca relatively simple, but somewhat bigger than in the previous species (figs. 67, 160).

Sternum fawn with brown margin, covered with long white setae. Coxae yellow with fawn shade. Maxillae and labium fawn with white tips. Chelicerae brown, anteriorly dark brown, with a large black tooth on the anterior inner margin (fig. 75).

Legs. Tarsi, metatarsi, patellae and distal $\frac{1}{3}$ of femora I–IV fawnish-brown, proximal parts of femora I–IV — yellowish-fawn. Tibia and patella I somewhat more massive than other segments. Tarsus, metatarsus, tibia and patella I covered with white scales and sparse short black setae. On the ventral surfaces of these segments there are also fine white setae. The setae and scales covering the second pair of legs are similar but less numerous. Legs III and IV with sparsely scattered single scales and setae. Claws typical, with teeth. Scopulae

and tarsal tufts typical. Length of segments of legs: I 0.69–0.48 (0.61)+0.63–0.48 (0.56)+0.93–0.81 (0.89)+1.08–0.90 (1.00)+1.44–1.26 (1.34), II 0.63–0.60 (0.61)+0.51–0.42 (0.49)+0.72–0.60 (0.66)+0.84–0.69 (0.76)+1.26–1.11 (1.18), III 0.66–0.57 (0.61)+0.72–0.60 (0.67)+0.66–0.54 (0.61)+0.78–0.63 (0.71)+1.39–1.22 (1.32), IV 0.84–0.60 (0.74)+0.96–0.78 (0.87)+1.05–0.87 (0.97)+1.08–0.84 (0.79)+1.96–1.66 (1.84). Ratio d 1.6–1.5 (1.57).

***Yllenus saliens* O. PICKARD-CAMBRIDGE, 1876**

Synonyms: *Attus saliens*: SIMON, 1885.

Attulus saliens: SIMON, 1889.

Pseudomogrus saliens: SIMON, 1937.

Material: a) "*Yllenus saliens* O. P. C." "92, Egypt" — 1 ♂ (DZ-Oxford); b) "5979. *Att. saliens* Cb., Alex. Suez, le Caire" — 4 ♀♀, 3 ♂♂, 1 juv. — (coll. E. Simon, MNHN-Paris). Identification of these specimens is uncertain and they may belong to different species. There are some differences among the specimens; I have studied only one female. c) Libya, El Kufra Highland: Hatha n'Gur Atta, 7. IV. 31, GIALO leg. — 1 ♀ (sub *Attulus saliens* det. L. DI CAPORACCIO; MCSN-Genova).

The assigning of the above mentioned females to the species *Yllenus saliens* O.P.C. is not completely certain. Unfortunately I could not find the female syntype in the collection of O. PICKARD-CAMBRIDGE in Oxford. Although the resemblances of the female studied to the female of *Y. squamifer* (SIM.) are quite striking, there are differences in the structure of the copulatory canals and spermathecae, and the differences from *Y. salsicola* (SIM.) are even more pronounced. It seems that only a study of statistically representative samples of females of these three species will give valid conclusions as to their systematic positions. Until such a study has been carried out I provisionally retain the female described here within the species *Y. saliens* O.P.C.

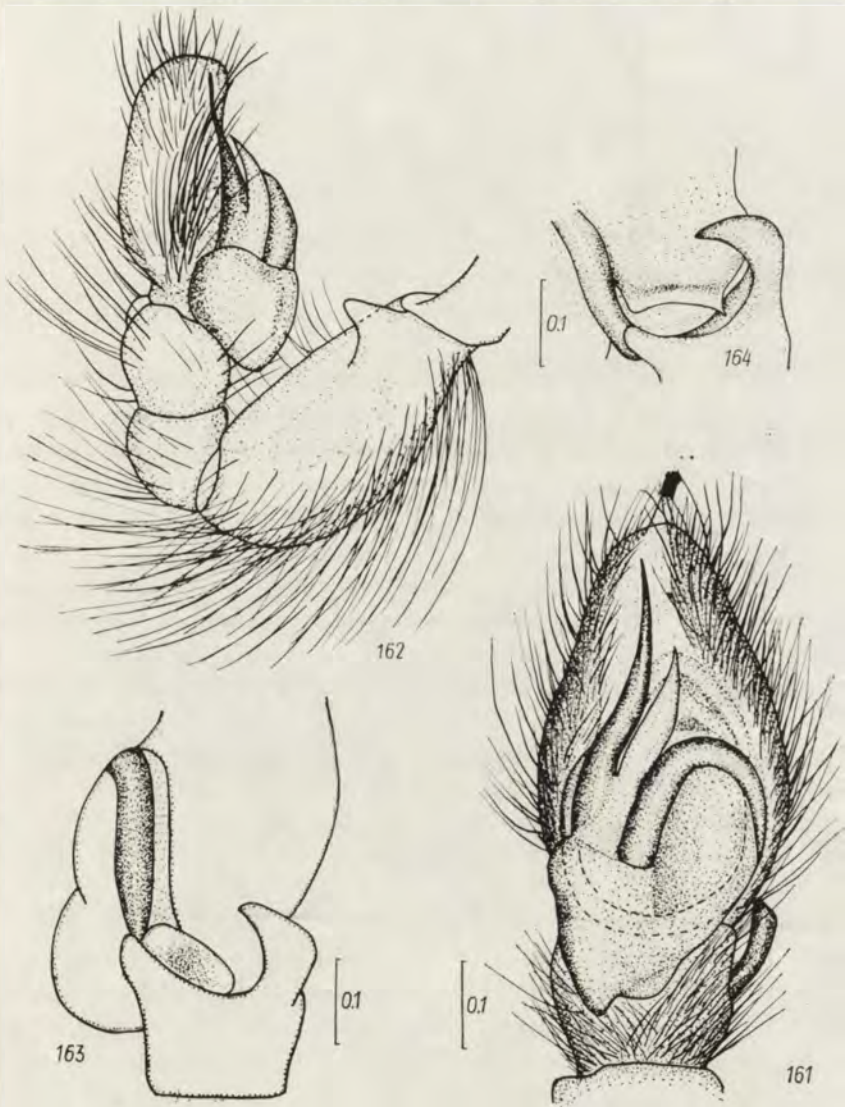
Description of male

Cephalothorax brown with surroundings of eyes somewhat darker. Eye field covered with whitish-grey scales, without any distinct colour pattern but with a transverse stripe of more intensely white scales between eyes II and III, the scales on the lateral margins of eye field and especially near eyes III being larger than the other scales. Thorax partly bald with the remnants of a median longitudinal stripe of grey scales, about $\frac{1}{3}$ breadth of the thorax wide, and also with remnants of two lateral stripes, of the same breadth, covered with comparatively large and intensely white scales. Ventral edge of the carapace covered with large white scales. Length of cephalothorax 1.80, length of eye field 0.90, width of eye field I 1.35, width of eye field III 1.26. Ratios: a 0.50, b 1.10, c 0.66.

Abdomen dorsally whitish-yellowish-grey, covered with white scales. Indistinct median longitudinal stripe covered with colourless scales. Abdomen ventrally whitish-yellowish-grey. Length of abdomen 1.62.

Sternum yellow covered with long and fine white scales. Coxae yellowish-grey, covered rather densely with white scales and more sparsely with short white setae. Maxillae and labium fawn with white tips. Chelicerae brown, typical.

Pedipalps. Copulatory organ resembles in general shape that of previously discussed species of this group but both cymbium and bulbus are much more narrow. Posterior part of bulbus is quite narrow and has a triangular outline.



Figs. 161-164. *Yllenus saliens* O. P. C. — ♂, right copulatory organ: 161 — ventral view, 162 — lateral view of inner surface, 163 — articulating apparatus, lateral view, 164 — the same, antero-lateral view.

Stylus and conductor arise from a common trunk and separate only above the level of the middle of the anterior part of the bulbus. Both are relatively short (figs. 8, 161, 162). Articulating apparatus resembles that of previous species, but the plate-like cymbial apophysis is relatively short. Femoral protuberance distinct and elevated (figs. 26, 42, 163, 164).

Legs pale yellow with greyish shade, covered with white scales and setae. Spines present. Claws somewhat finer than in related species, the difference between claws I-II and III-IV is less pronounced. Claw I with single tooth. Scopulae and tarsal tufts typical. Length of segments of legs: I $0.60 + 0.54 + 0.66 + 0.66 + 1.02$, II $0.51 + 0.45 + 0.51 + 0.57 + 1.02$, III $0.54 + 0.51 + 0.48 + 0.45 + 0.93$, IV $0.48 + 0.66 + 0.90 + 0.90 + 1.82$. Ratio d 1.8.

Description of female (based on specimen from SIMON's collection)

Cephalothorax pale fawn, with lateral margins of eye field black. Covered uniformly with whitish scales, no colour pattern. Length of cephalothorax 2.09, length of eye field 0.93, width of eye field I 1.35, width of eye field III 1.62. Ratios: a 0.45, b 0.83, c 0.69.

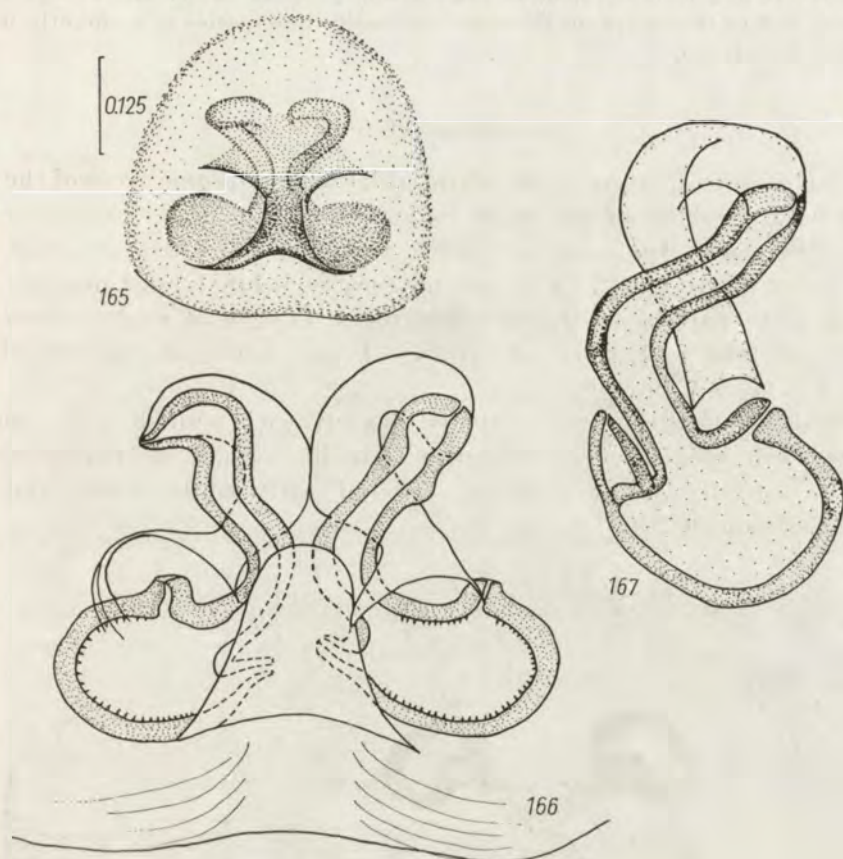
Abdomen dorsally pale yellow with a grey shade. Longitudinal median stripe greyish, lancet-shaped but with distinct margins passing gradually into the colour of the remaining part of the abdomen without any sharp border. The whole abdomen covered sparsely with large and whitish, semitransparent scales. Abdomen ventrally pale yellow, covered with semitransparent scales and greyish setae. Length of abdomen 2.46.

Epigynum resembles that of *Yllenus squamifer* (SIM.) but vaginal roof is narrower and ends on the level of the posterior ends of the spermathecae. Copulatory openings located closer to the spermathecae and much broader (fig. 165). Spermathecae are less elongated and their distal parts shorter and located more posteriorly than in *Y. squamifer* (SIM.). The copulatory canals consist of stronger and less sclerotized parts, their loop is smaller, the less sclerotized part of the loop bypassing below the sclerotized part (fig. 166). Spermatheca and copulatory canal of the specimen from Kufra (fig. 167) correspond with those described above, but display some small differences in details. The evaluation of these differences must be deferred until more specimens become available.

Sternum pale yellow, covered with fine and long whitish setae. Coxae pale fawn (III and IV somewhat paler) covered with whitish scales and setae. Maxillae and labium light brown, tipped white. Chelicerae fawnish-brown, with a sclerotized edge on the inner anterior margin, terminated by a small black tooth (fig. 73). Pedipalps pale fawn covered with whitish-grey setae and white scales.

Legs pale fawnish-yellow, covered with whitish-grey and brownish setae and numerous whitish scales. Spines present. Claws typical, without teeth.

Scopulae I–II short, tarsal tufts III and IV present. Length of segments of legs: I $0.52+0.44+0.74+0.81+1.13$, II $0.52+0.44+0.59+0.62+1.01$, III $0.49+0.59+0.54+0.52+1.01$, IV $0.52+0.76+1.03+1.01+2.02$. Ratio d 1.91.



Figs. 165–167. *Yllenus saliens* O. P. C. — ♀, copulatory organ; 165 — epigynum, 166 — epigynum after maceration (Suez specimen), 167 — right spermatheca and copulatory canal (Libyan specimen).

III. The *arenarius* group

Males with very massive cymbium, large bulbus, long stylus, long and massive conductor. Tibial apophysis very massive.

Females with epigynum very strongly sclerotized. Copulatory canals short, straight and strongly sclerotized.

Yllenus flavociliatus SIMON, 1895

Synonym: *Yllenus humiger flavociliatus* SIMON, 1895.

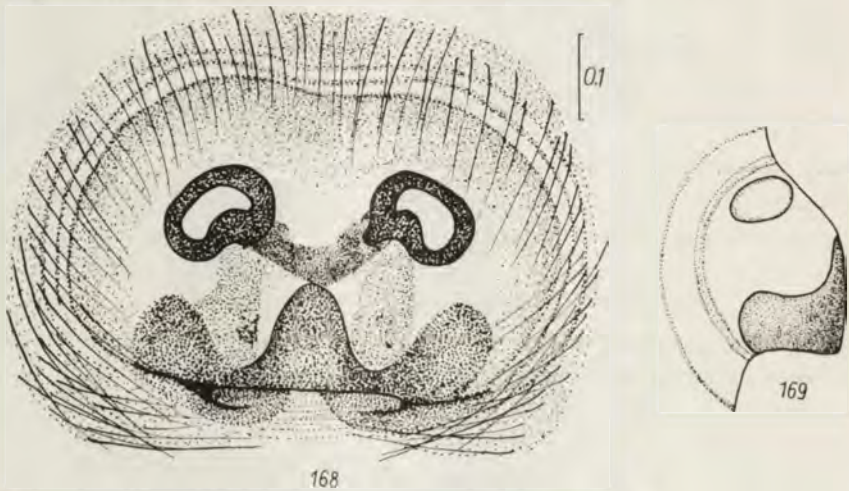
Material: "*Yllenus flavociliatus* SIMON, Mongolia Sept. (POTANIN)" "13347" — 1 ♀ — holotype (MNHN-Paris).

Remarks: As the specimen studied is the only one known, I have not made a preparation of the epigynum due to the risk of damage or loss of it. The external features of the epigynum are, however, so specific that mistaking it with any other species seems to be unlikely. The fragments of copulatory canals and spermathecae visible through the semi-transparent wall of the epigynum allow one to classify this species as undoubtedly belonging to the *arenarius* group.

Description of female

Cephalothorax covered with white scales which in some areas of the cephalothorax have a reddish or yellowish shade. However, there is no definite colour pattern. There are also some fine white setae. A dense row of stout brown bristles occur above eyes I, with similar bristles below lateral margins of eye field and very sparsely on the eye field itself. Length of cephalothorax 2.52, length of eye field 1.17, width of eye field I 1.53, width of eye field III 1.58. Ratios: *a* 0.47, *b* 0.96, *c* 0.74.

Abdomen dorsally greyish, covered densely with whitish scales sprinkled with a few pale reddish ones. The latter form ill defined inconspicuous spots. Abdomen ventrally yellowish-white, covered with white scales and setae. Length of abdomen 2.92.



Figs. 168–169. *Yllenus flavociliatus* SIM. — ♀, epigynum: 168 — ventral view, 169 — lateral view.

Epigynum yellow, strongly sclerotized, with central part prominently elevated (fig. 169). The vaginal roof is not elevated above the epigynum but is clearly seen as a darker brown spot, expanded behind the spermathecae. Edges of copulatory openings strongly sclerotized (fig. 168). As far as it is possible to judge from the outlines seen through the wall of the epigynum — the copulatory canals are straight and probably resemble those of *Y. horvathi* CHYZER.

Sternum brownish-grey, covered sparsely with long and fine white setae. Coxae yellowish-white, covered with white setae. Maxillae and labium brownish-fawn with white tips. Chelicerae brown, covered very sparsely with brown setae. There is no tooth on the anterior inner margin. Clypeus covered densely with white setae. Pedipalps yellow, covered with white setae.

Legs pale yellow with the exception of tarsi and metatarsi I–II, which are pale fawn. Covered sparsely with whitish scales and setae, there are also sparse brown setae on tarsi I–IV and on metatarsi, tibiae and patellae I–II. Scopulae I–II short and worn, consisting of short and fine setae. Tarsal tufts III–IV typical. Claws typical, I and II with numerous long teeth in the basal part of the claw, III and IV with 6 or 7 long teeth in the median part of the claw. Length of segments of legs: I $0.72 + 0.48 + 0.78 + 1.02 + 1.96$, II $0.66 + 0.48 + 0.72 + 0.84 + 1.26$, III $0.84 + 0.78 + 0.81 + 0.72 + 1.49$, IV $0.72 + 0.96 + 1.35 + 1.17 + 2.24$. Ratio d 1.67.

Yllenus horvathi CHYZER, in CHYZER et KULCZYŃSKI, 1891

Material. Hungary: a) "*Yllenus horvathi* CHYZER" "Keeskemet" — 1 ♀ — holotype; b) Örkény, collected between 6. X.–7. XI. 1931 and on 6. V. 1932, leg. (and det.) G. KOLOSVÁRY — 8 ♂♂, 2 ♀♀ (four tubes); c) "*Yllenus horvathi* CHYZER...." (the remaining part of label illegible). (All the above listed material in TMA-Budapest). Bulgaria: d) Nature reserve Dikili-Tash near Varna, sandy ground with "pillars" and limestone rocks. Spiders caught on the sand, under tufts of grass, 29. IX. 1960, leg. J. et W. STARĘGA — 5 ♂♂, 2 ♀♀ — (I. Z. PAN-Warszawa).

Remarks. The specimens from Hungary and those from Bulgaria differ to some extent, but the material is not sufficient to decide whether the differences are more important than the resemblances. Because both groups of specimens occur in easily accesible areas where more detailed studies, including biological ones, can be easily carried out, it seems to me advisable to defer the decision about the systematic position of both groups until new evidence is provided. Therefore, I am considering both groups of specimens provisionally as belonging to the same species, although they may finally appear to be rather separate subspecies or even species.

Description of male

Cephalothorax fawnish-brown with two paler longitudinal streaks on the thorax, separated by a darker median streak and bordered by dark lateral margins of the thorax. Eyes surrounded with black. This general colouration is quite variable; among 5 specimens from Hungary it varies from pale fawn with a very striking dark median streak, to dark brown with the darker median streak barely visible. One of the specimens from Bulgaria resembles in this respect the Hungarian specimens, while the thorax of the second one is uniformly dark brown, with two streaks of white scales instead. The eye field

varies greatly in both groups of specimens. The Hungarian specimens have it covered with white scales sprinkled with a few black or (in one specimen) orange ones. All scales are arranged in lines forming a "halved onion"-like pattern. The presence of black or orange scales makes this pattern even more conspicuous. There is no other distinct colour pattern. On the thorax black scales cover dark streaks, white scales are concentrated on paler streaks. Eye field of Bulgarian specimens covered with black scales sprinkled with orange scales — all arranged in an "halved onion" pattern. White scales are arranged into two parallel, longitudinal lines, stretching from eyes I median up to the level of eyes III. The breadth of each white line is about $\frac{1}{9}$ th of the breadth of the eye field. The lines are separated by a median line of black scales, of approximately the same breadth, but becoming narrower towards the front. These white lines form an extremely striking character and provide the most conspicuous difference between the Hungarian and Bulgarian specimens. They correspond with the character given in the original description of *Y. vittatus* THOR., but differ from the type specimens of that species (see discussion in description of *Y. vittatus* THOR.).

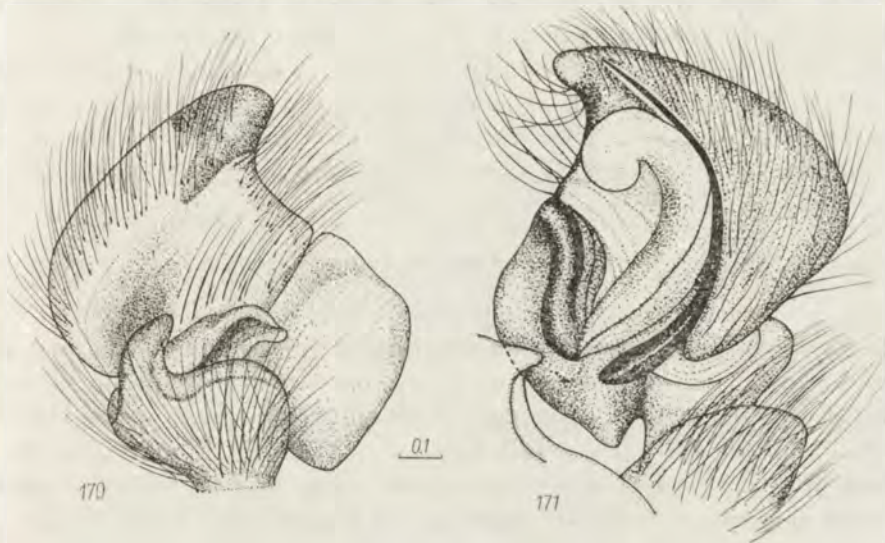
There is a row of stout brown bristles above eyes I in the majority of the specimens studied. Similar bristles occur below the lateral margins of the eye field, and a few smaller bristles are scattered over the eye field as well. Length of cephalothorax in Hungarian specimens is (for 7 specimens) 2.60–2.10 (2.41), length of eye field 1.14–0.90 (1.09) width of eye field I 1.49–1.30 (1.39), width of eye field III 1.62–1.36 (1.49). Ratios: *a* 0.46–0.42 (0.44), *b* 0.96–0.89 (0.94), *c* 0.81–0.69 (0.76). The same measurements are slightly different in Bulgarian specimens and runs as follows: length of cephalothorax (for 5 specimens) 2.57–2.03 (2.29), length of eye field 1.22–1.02 (1.12), width of eye field I 1.44–1.26 (1.33), width of eye field III 1.62–1.35 (1.45). Ratios: *a* 0.53–0.42 (0.44), *b* 0.97–0.88 (0.93), *c* 0.88–0.78 (0.82).

Abdomen dorsally. In the Hungarian specimens the colouration and pattern are variable, but only one specimen has it well preserved, in other specimens some of the scales have fallen out. There is a lancet-shaped longitudinal spot of silver scales bordered with brown scales. It stretches along the whole length of the abdomen and covers $\frac{3}{4}$ of its breadth. The remaining part of the abdomen is covered with creamy-yellow scales. Lateral surfaces of the abdomen dark brown, their lower parts olive-greyish-yellow. Abdomen ventrally whitish-grey with two fine longitudinal darker lines. Lateral margins greyish-olive, but variable in shade. Length of abdomen 3.00–1.53 (2.55).

In the Bulgarian specimens the lateral margins of the dorsal surface of the abdomen are covered with black scales and have the appearance of dark stripes, resembling those in the Hungarian specimens. The intervening surface between these stripes is, however, covered with silver scales, and there are also two longitudinal rows of dark spots consisting of black scales. In one of the Bulgarian specimens the dorsal surface is dark with rows of silver spots and there

is a thin longitudinal silver stripe between these rows. The lower parts of the lateral surfaces of the abdomen are whitish-grey in all Bulgarian specimens. The abdomen is white ventrally with median longitudinal lines hardly visible. Lateral margins silver-greyish. Length of abdomen 2.66–1.96 (2.34).

Sternum varies from brownish-grey to yellowish-fawnish-grey with a darker margin. Covered with white scales and long and fine white setae. There are no distinct differences between the two groups of specimens in this character. Coxae whitish-yellowish-fawn, but yellowish-fawn in some Hungarian specimens. Maxillae and labium vary from yellowish-fawn to fawnish-brown with white tips. Chelicerae typical, colour varies from pale brown to dark brown.



Figs. 170–171. *Yllenus horvathi* CHYZ. — ♂, copulatory organ, lateral view: 170 — outer surface, 171 — inner surface.

Pedipalps. Copulatory organ massive and broad. Dorsal surface of the cymbium elevated and rounded. Bulbus large and massive, its anterior part one and half times longer than the posterior. Stylus and conductor arise from the lateral surface of the bulbus. The long and massive conductor is bent near its distal end. Stylus also long and massive (figs. 10, 170, 171). Cymbium apophysis in the form of a large sclerotized plate irregularly corrugated. Hook-like apophysis of the tibia large and massive. There is a large depression on the cymbium corresponding with this apophysis (figs. 30, 170). Femoral protuberance high and bent anteriorly (fig. 43). I have not noticed any distinct differences between the copulatory organs of the Hungarian and Bulgarian male specimens.

Legs yellowish-white or yellowish-fawn with irregular darker spots consisting of black scales; these spots do not form any distinct or constant pattern. Apart from this, the legs are covered with white scales, those in the Bulgarian

specimens are much more dense than those in the Hungarian, but their abundance is very variable in the latter. There are a few black scales, and white and black setae as well. Spines present. Claws I–IV long and massive with a number of long and massive teeth, distributed densely along the whole length of the claw. Scopulae and tarsal tufts typical. Length of segments of legs in Hungarian specimens: I 0.75–0.63 (0.71)+0.60–0.51 (0.56)+1.02–0.84 (0.97)+1.14–0.96 (1.05)+1.58–1.30 (1.53), II 0.75–0.60 (0.68)+0.69–0.54 (0.62)+0.90–0.78 (0.84)+0.99–0.81 (0.90)+1.48–1.22 (1.33), III 0.87–0.60 (0.74)+0.96–0.78 (0.88)+0.93–0.78 (0.86)+0.84–0.69 (0.79)+1.71–1.26 (1.52), IV 0.90–0.66 (0.74)+1.11–0.90 (1.04)+1.40–1.20 (1.27)+1.22–1.05 (1.15)+2.38–1.96 (2.16). Ratio d 1.6–1.4 (1.45). The same in Bulgarian specimens are: I 0.87–0.66 (0.75)+0.63–0.54 (0.59)+1.02–0.84 (0.91)+1.14–0.93 (1.01)+1.44–1.22 (1.33), II 0.78–0.66 (0.71)+0.72–0.57 (0.62)+0.87–0.72 (0.80)+1.02–0.78 (0.88)+1.44–1.26 (1.35), III 0.90–0.63 (0.72)+0.93–0.78 (0.84)+0.87–0.78 (0.80)+0.90–0.75 (0.80)+1.62–1.31 (1.43), IV 0.84–0.66 (0.73)+0.90–1.02 (0.74)+1.35–0.93 (1.15)+1.22–1.05 (1.11)+2.10–1.96 (2.05). Ratio d 1.7–1.1 (1.5).

Description of female

Cephalothorax brown with patches of light brown; area round eyes II and III black. There is a median longitudinal stripe on the thorax, flanked by two pale stripes, the three occupying the whole breadth of the dorsal surface. A broad brown stripe runs diagonally from the lateral eyes across the side of the cephalothorax, below it a parallel yellow stripe. Ventral margin of the carapace dark brown. Eye field of Hungarian specimens covered with whitish scales, distributed sparsely at intervals equal to the breadth of a scale. In one of the specimens the scales are grey and denser. There is an inconspicuous pattern in the anterior part of the eye field formed of intensely white scales, and consisting of a "V"-shaped white streak equal to $\frac{1}{2}$ of the length of the eye field. It arises from between median eyes I. Two similar but shorter streaks, equal to about $\frac{1}{5}$ of the length of eye field, arise from between median and lateral eyes I. Between these three white streaks faint darker stripe runs diagonally from the back of eye I median to eye II. In one specimen this darker streak is due to the darker colouration of the chitin which is covered with colourless scales; in a second specimen it is covered with scales with a black median streak and black borders. Lateral surfaces of the cephalothorax and dorsal surface of the thorax covered with white scales; black scales occur only on the darker median streak of the thorax. There are long and stout black bristles above eyes I, below lateral eyes, and also shorter ones in the posterior part of the eye field.

In the Bulgarian specimens the colouration of the cephalothorax is uniformly blackish-brown. Eye field covered very densely with whitish scales with a steel gleam, sprinkled with a few orange scales. The resulting appearance of the eye field is grey. The anterior margin of the eye field is covered with more intensely

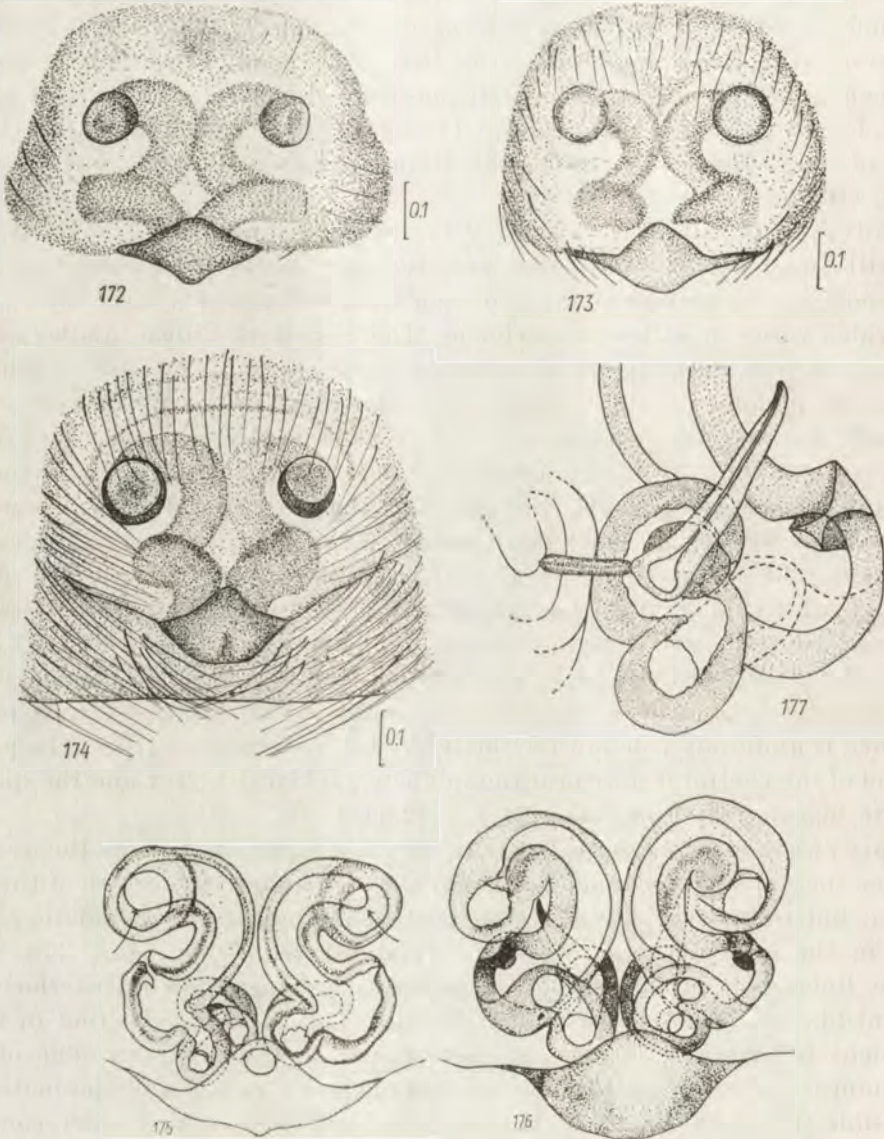
white scales, but there is no "V"-shaped area of spots as in the Hungarian specimens and there are no darker stripes.

Scales on the thorax are long, broad and uniformly white. On the lateral surfaces of the cephalothorax there are also a few scattered reddish and black scales. There are long black bristles above eyes I and below the lateral eyes, but the bristles in the posterior part of the eye field are much longer than are the similar bristles on the Hungarian specimens, and are almost as long as the bristles occurring below the lateral eyes. Length of cephalothorax in Hungarian specimens as well as in two Bulgarian specimens (in parentheses): 2.38 (2.52–2.45), length of eye field 1.14 (1.13–1.14), width of eye field I 1.48 (1.49–1.31), width of eye field III 1.62 (1.67–1.58). Ratios: *a* 0.48 (0.45–0.47), *b* 0.91 (0.89–0.83), *c* 0.77 (0.76–0.87).

Abdomen dorsally yellowish-grey in Hungarian specimens, covered densely with small white scales. There are also black scales, which together with dark spots on the surface of the abdomen form an indistinct dark brown pattern which varies in different specimens. There are dark brown bristles scattered very sparsely over the dorsal surface of the abdomen. The general colouration of the abdomen in the Bulgarian specimens is silver-yellowish-grey with a metallic gleam. Covered very densely with white scales, sprinkled with a few orange scales. These latter are denser on the lateral surfaces of the abdomen. There are neither darker spots nor any darker pattern on the dorsal surface, but the black bristles are much more numerous than they are in the Hungarian specimens. The scales on the dorsal surface lie flat against the surface of the abdomen whilst those on the lateral surfaces project outwards and backwards. Abdomen ventrally pale grey in Hungarian specimens with two thin dark grey stripes along the mid-line and with two broad whitish stripes along-side them. The spinnerets are fawn. In the Bulgarian specimens the ventral surface of the abdomen is uniformly pale fawn without any trace of darker stripes. The posterior end of the ventral surface near the spinnerets is blackish-grey and the spinnerets are black. Length of abdomen 3.45 (2.99–2.88).

Epigynum strongly sclerotized. In the Hungarian specimens the vaginal roof has the shape of a diamond. It is not elevated above the surface of the epigynum, but forms the most posterior part of the epigynum. Copulatory openings in the form of round strongly sclerotized depressions (figs. 172, 173). In the Bulgarian specimens these depressions are surrounded posteriorly by crescent-like strongly sclerotized margins (fig. 174). The vaginal roof in these specimens is narrower, longer and more rounded. The posterior edge of the epigynum is more angular in appearance. Copulatory canals and spermathecae are visible through the wall of the epigynum, and their outlines vary considerably amongst both groups of specimens. However, the variation amongst the Hungarian specimens is as great as that between the two groups, Hungarian and the Bulgarian specimens. The copulatory canals are short, broad, thick-walled and bent anteriorly. The distal parts of the spermathecae are entangled

and very complicated. Openings of accessory glands large and distinct; in the Bulgarian specimens they are extended by a funnel-like swelling of the internal wall of the spermatheca. The other special features of the Bulgarian specimens are the more strongly bent anterior parts of the copulatory canals and the more complicated distal parts of the spermathecae (figs. 69, 70, 175, 176, 177).



Figs. 172-177. *Yllenus horvathi* CHYZ. — ♀, copulatory organ. 172-174 — epigynum: 172 — Hungarian specimen I, 173 — Hungarian specimen II, 174 — Bulgarian specimen. 175 — epigynum after maceration, Hungarian specimen, 176 — the same, Bulgarian specimen. 177 — left spermatheca dorsal view, Bulgarian specimen.

Sternum yellow with greyish-brown margin in Hungarian specimens, covered with long and fine white setae. The Bulgarian specimens differ in that the sternum is olive-grey with dark grey margin and black edge. Coxae yellowish-fawn; but in the Bulgarian specimens whitish-yellow with an olive gleam. Maxillae and labium fawn with white tips; but in the Bulgarian specimens fawn with olive gleam and white tips. Chelicerae typical, dark brown; but in the Bulgarian specimens blackish-brown. Pedipalps yellowish-fawn, but in the Bulgarian specimens yellowish-olive.

Legs in the Hungarian specimens yellowish-brown with thin but distinct dark brown incomplete rings on proximal ends of tibiae I–IV and distal ends of femora I–IV. There are dark diagonal stripes on the distal ends of tibiae III–IV extended on the proximal ends of metatarsi III–IV. Dark spots occur in the analogous areas of metatarsi and tibiae I–II; similar spots occur also in the distal parts of patellae I–IV. Claws typical, I and II black, III–IV pale brown. Length of segments of legs: I $0.72 + 0.54 + 0.81 + 1.02 + 1.31$, II $0.69 + 0.51 + 0.75 + 0.84 + 1.22$, III $0.69 + 0.78 + 0.81 + 1.20 + 1.44$, IV $0.72 + 1.02 + 1.26 + 1.17 + 2.17$. Ratio \bar{d} 1.5.

In the Bulgarian specimens, the legs are pale olive with femora I–IV somewhat paler. There are no distinct dark rings but there are very faint grey ones at the proximal ends of metatarsus and tibia IV. There are indistinct darker markings on the dorsal surfaces of metatarsi, tibiae and patellae I–IV. There is also a group of black scales on the dorsal surface in the proximal part of patella IV forming a dark spot. Claws typical, black. Scopulae and tarsal tufts blackish-grey, typical. Length of segments of legs: I $0.75-0.66 + 0.51-0.48 + 0.84-0.81 + 1.02-0.99 + 1.62-1.44$, II $0.63-0.63 + 0.60-0.51 + 0.78-0.75 + 0.99-0.93 + 1.39-1.20$, III $0.78-0.78 + 0.78-0.78 + 0.78-0.78 + 0.84-0.84 + 1.62-1.49$, IV $0.78-0.72 + 1.05-1.02 + 1.26-1.31 + 1.22-1.17 + 2.38-2.10$. Ratio \bar{d} 1.6–1.7.

General remarks on habitat of *Y. horvathi* CHYZER

The habitat of *Y. horvathi* CHYZER was neither described by CHYZER (CHYZER and KULCZYŃSKI, 1891) nor by KOLOSVÁRY (1934). Dr. A. SÓOS, Budapest, has kindly given me some information about the locality Örkény in Hungary from where the majority of specimens I have studied came. It is a sandy area covered sparsely with juniper and with scattered single oak trees remaining from bigger oak forests which were cut down some 100 years ago. Örkény is located some 40 kilometres south of Budapest, to the north of Kecskemét, between the rivers Danube and Tisa. At present this area has undergone deep changes and the environment from which KOLOSVÁRY has collected his specimens does not exist any longer. However, some similar environments have been preserved to the south of Örkény. The environment in which Mr. W. STAREGA collected his specimens in Dikili-Tash near Varna in Bulgaria is rather similar to that in Örkény — dry sandy area with xerothermic vegetation.

In view of the close relationships and simultaneously striking differences between both groups of specimens it would be valuable to study *Yllenus* specimens from the intermediate stations between Órkény and Dikili-Tash. Such research may not only solve the question of the exact systematic positions of both groups of specimens, but it may also throw light on the origin and nature of these differences and also perhaps on the process of speciation in this group of spiders.

Yllenus arenarius MENGE, in SIMON, 1868

Synonyms: *Marpesia arenicola* MENGE, 1877; *Yllenus arenicola*: SIMON, 1937.

Material. Poland: Kotuń, distr. Siedlce, 23. IV. 1962 — 2 ♂♂ and Fronolów, distr. Łosice, 16. VI. 1962 — 4 ♀♀, leg. W. STAREGA (I. Z. PAN-Warszawa). Collected on sand dunes sparsely covered with pine trees and juniper.

Remark 1. This species has been found recently in Zielonka, 20 km. east from Warsaw (STAREGA, 1966) and I have collected a number of ♀♀ and ♂♂ on bare sand dunes in Puszcza Kampinoska (Kampinos National Park) near Kazuń, 30 km. north from Warsaw on 24. IX. 1967 so it may be much more common in Poland than it appeared a few years ago.

Remark 2. Type specimens of this species most probably were destroyed during the Second World War.

Description of male

Cephalothorax brown, surrounding of eyes black. Eye field covered anteriorly with black scales sprinkled with white ones. All scales are arranged along diagonal lines arising anteriorly medially, and passing black laterally. This is particularly conspicuous because some white scales form regular dotted lines on the black background of other scales. There are two thick diagonal stripes of white scales coming from eyes III and meeting on the level of eyes II, which form a white mark pointed at the front. The median longitudinal stripe on the dorsal surface of the thorax is covered with black scales. It is followed by two broad parallel stripes of white scales, running along the lateral margin of the thorax from its posterior edge up to eyes III and extended below the lateral margin of the eye field up to eyes I lateral. Lateral surfaces of the cephalothorax blackish-brown, covered with thin and elongated white scales. Ventral edge of the carapace covered densely with broad white scales. Length of cephalothorax (two specimens) 2.52–2.73, length of eye field 1.11–1.14, width of eye field I 1.44–1.53, width of eye field III 1.53–1.66. Ratios: a 0.44–0.42, b 0.94–0.92, c 0.77–0.74.

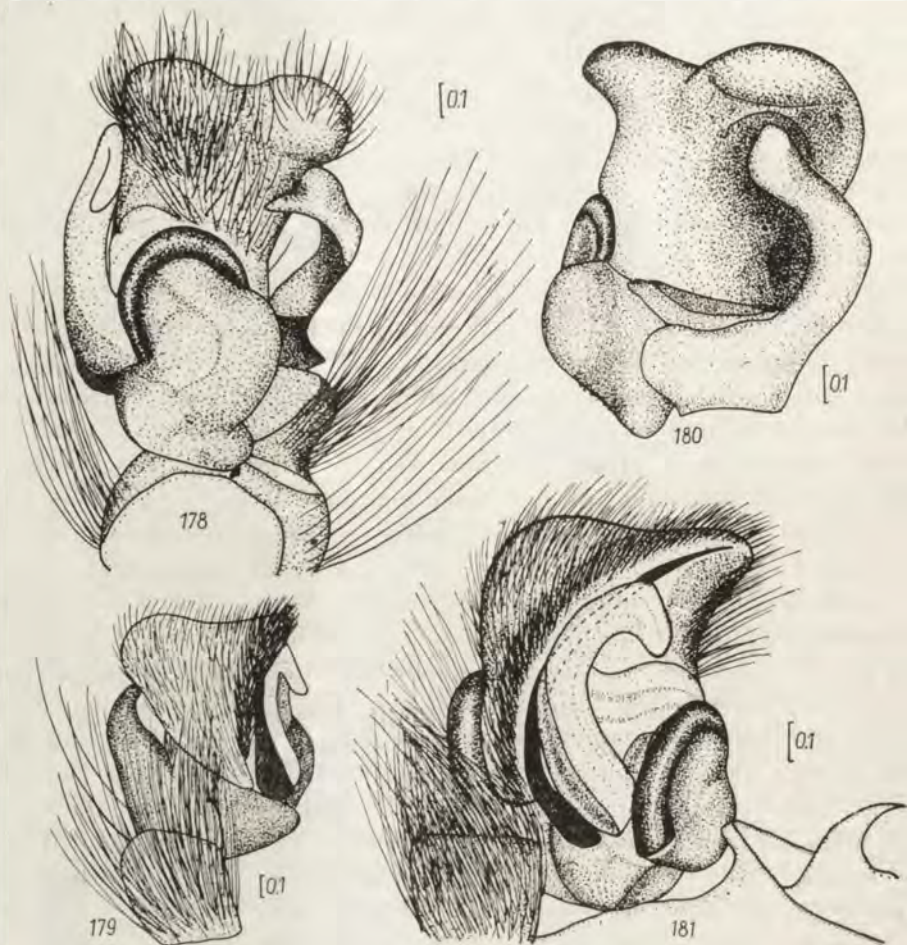
Abdomen dorsally covered with black scales sprinkled with white ones over the whole surface of the abdomen. There are also two rows of spots consisting of white scales. The two anterior spots have the form of white lines and stretch for $\frac{1}{5}$ th of the length of the abdomen. The next spots resemble short diagonally oriented lines arranged in transverse rows in the form of the "V"s pointed backwards. Both arms of the "V" in the first row meet, in the

next rows they remain unconnected. The two first rows of these diagonal lines cover $\frac{2}{5}$ ths of the whole length of the abdomen and the whole breadth of its dorsal surface. Further rows of diagonal lines are less regular, they form two median diagonal lines and a pair of wavy lateral lines. Lateral surfaces of abdomen covered with white scales. Abdomen ventrally whitish-fawnish-grey, covered with transparent fine scales; in the second specimen covered densely with large whitish-silver scales. The colour of the surface itself is not visible. Length of abdomen 1.82–3.22.

Sternum blackish-brown, covered with fine white setae and a few large and intensely white scales. Coxae yellowish-fawn with anterior surfaces brownish-grey. These are very intense on coxae I and gradually less intense on the following coxae. On coxae IV the darkening of the anterior surface is barely visible. Maxillae and labium greyish-olive with white tips. Chelicerae. Posterior surfaces dark brown or brown, the anterior ones blackish-brown. Typical, without tooth on anterior inner margin.

Pedipalps. Copulatory organ very massive. There is an enormous ridge on the lateral external surface of the cymbium with a semicircular depression on its posterior wall forming some kind of articulating surface for the great tibial apophysis. The outline of the cymbium is rather unusual — its external lateral aspect resembles an irregular quadrilateral figure; the dorsal aspect is triangular (figs. 179, 180). Bulbus, although large, appears small in comparison with the massive cymbium. Conductor is long and massive, bent at the end. Stylus long and resembling that in *Y. horvathi* CHYZER; it lies on the lateral surface of the cymbium (figs. 9, 178, 181). Tibial apophysis (fig. 29) enormously long and massive and rather complicated in shape. It is equal to $\frac{2}{3}$ rds of the length of the cymbium. The apical edge of the tibia near the base of the apophysis articulates also with a sclerotized plate which is long and complicated in shape, arising from the lateral surface of the cymbium. Femoral protuberance high and bent forwards (fig. 44).

Legs yellowish-fawn with darker spots, covered with white and black scales and white and brown setae. Spines present. The darker spots consist of black scales and occur on the dorsal surface near the proximal end of metatarsus I and, somewhat less conspicuously on the metatarsi of the remaining legs. The dark incomplete rings consisting of similar scales occur on tibiae I–III and there is a longitudinal dark stripe on the dorsal surface of tibia IV. On the second specimen these rings on the tibiae are much swollen and cover the greater part of the dorsal surface. On the lateral surface there is a continuous dark spot covering almost the whole surface. Patellae I–IV with a pair of dark spots on the lateral surfaces, their dorsal surfaces are somewhat darkened. Large dark spots cover most of the lateral surfaces and part of the dorsal surfaces of femora I–IV. Claws typical, with a number of large and long teeth along the whole of their length. Scopulae and tarsal tufts typical. Length of segments of legs: I 0.69–0.84 + 0.66–0.77 + 0.99–1.20 + 1.14–1.26 + 1.44–1.76,



Figs. 178–181. *Yllenus arenarius* MENGE — ♂, left copulatory organ: 178 — ventral view, 179 — dorsal view, 180 — lateral view of outer surface, 181 — the same, inner surface.

II 0.75–0.87 + 0.63–0.75 + 0.90–1.02 + 1.02–1.08 + 1.35–1.62, III 0.84–0.93 + 0.90–1.08 + 0.93–1.08 + 0.90–1.02 + 1.53–1.82, IV 0.72–0.84 + 0.96–1.20 + 1.30–1.62 + 1.17–1.35 + 2.38–2.66. Ratio d 1.4–1.5.

Description of female

Cephalothorax fawnish-olive-grey. Eye field covered with whitish scales, yellowish in the region of the eyes. There are 3 spots of intensely white scales at the anterior margin of the eye field, corresponding with patches of white scales between eyes I. Dorsal surface of thorax and lateral surfaces of cephalothorax covered with elongated, thin, white scales, but somewhat less densely than on the eye field. Along the ventral margin of the cephalothorax the colour

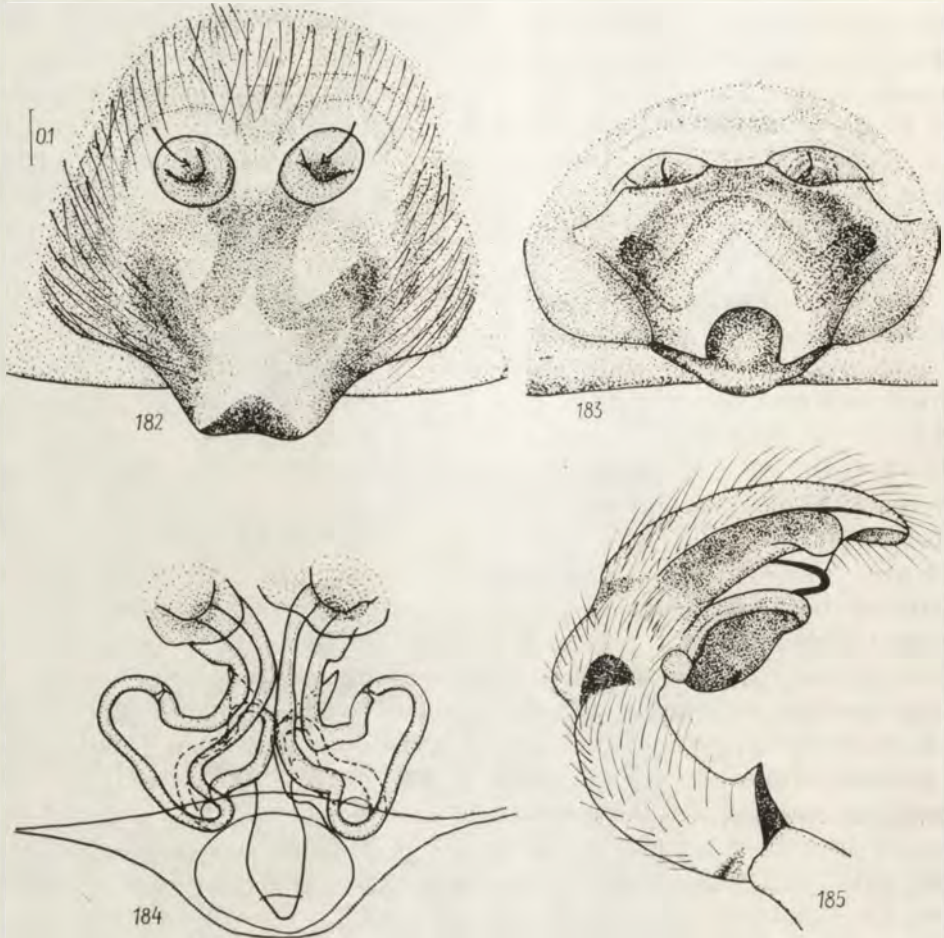
of the surface becomes yellowish-fawn. Ventral edge covered with broad white scales. Thick and stout brown setae above eyes I are relatively short and form separate "roofs" above eyes I median. Single black setae are present above eyes I lateral, beneath the lateral margins of the eye field and very sparsely over the eye field. Length of cephalothorax (four specimens) 2.66–2.45 (2.56), length of eye field 1.08–1.02 (1.06), width of eye field I 1.44 (four spec.), width of eye field III 1.58–1.53 (1.57). Ratios: *a* 0.44–0.38 (0.41), *b* 0.94–0.91 (0.92), *c* 0.75–0.71 (0.74).

Abdomen dorsally brownish-grey, covered densely with short whitish-grey scales with a silver gleam. They stick flatly to the surface of the abdomen. In some areas of the abdomen these scales have a yellowish-olive shade, but there is no colour pattern of any kind. Black setae scattered sparsely over the surface of the abdomen. Abdomen ventrally whitish-greyish-yellow with traces of two longitudinal grey stripes running from the epigynum up to the spinnerets. Covered with colourless scales and whitish and greyish setae. Length of abdomen 3.56–3.22 (3.37).

Epigynum very strongly sclerotized with the median part elevated and expanded above and behind the epigastral fold. The posterior part of the epigynum together with the vaginal roofs is bent underneath the epigynum and can be seen only from the posterior when the epigynum is arranged diagonally. In that position the outline of the vaginal roof becomes comparable with that in *Y. horvathi* CHYZER and the whole epigynum also becomes comparable in its general outline with the epigynum of *Y. horvathi* CHYZER (figs. 182, 183). Copulatory openings are located in the anterior part of the epigynum and resemble sclerotized funnels. Copulatory canals (fig. 56) relatively straight and short, thick-walled, resembling those in *Y. horvathi* CHYZER and *Y. vittatus* THOR. Proximal part of spermathecae relatively large and expanded forwards. Openings of accessory glands very small and hardly visible. Distal parts of spermathecae well developed and complicated (figs. 71, 184).

Sternum. Anterior half brown, posterior yellowish-fawn, covered with long and fine white setae and a few large scales arranged in a single line parallel to the margins of the sternum. Coxae whitish-yellow, covered with whitish setae and scales. Maxillae and labium fawnish-brownish-olive with white tips. Chelicerae dark brown, typical. Pedipalps yellowish-fawn, covered densely with long and fine setae.

Legs pale fawn, covered with white scales, white, grey and brown setae. Spines present. Small dark stripes consisting of black scales arise from darker spots on tibiae I–IV near their proximal ends, and on the distal ends of femora I–IV. Claws typical, their teeth are long but thin, barely conspicuous and located only in the proximal parts of the claws — a distinct difference from those in the male. Scopulae and tarsal tufts typical. Length of segments of legs: I 0.75–0.69 (0.73)+0.54–0.48 (0.51)+0.93–0.81 (0.85)+0.99–0.84 (0.92)+1.44–1.35 (1.41), II 0.75–0.66 (0.71)+0.57–0.51 (0.54)+0.78–0.72 (0.75)+



Figs. 182–184. *Yllenus arenavarius* MENGE — ♀, epigynum: 182 — ventral view, 183 — ventro-posterior view, 184 — after maceration. 185 — *Yllenus "arenavarius" MENGE*, Jehol specimen, male pedipalp (after SAITO).

+0.90–0.84 (0.88)+1.35–1.26 (1.31), III 0.87–0.75 (0.83)+0.87–0.78 (0.83)+
 +0.84–0.78 (0.82)+0.90–0.75 (0.84)+1.62–1.53 (1.56), IV 0.87–0.84 (0.85)+
 +1.11–1.02 (1.05)+1.44–1.35 (1.41)+1.26–1.03 (1.18)+2.45–2.38 (2.40). Ratio
d 1.8–1.6 (1.7).

***Yllenus "arenavarius" MENGE* sensu SAITO, 1936**

Synonym: *Marpissa arenavarius*: SAITO, 1936.

This species, reported by SAITO (1936) from Jehol (Northern China, between Pekin and Shenzang) certainly belongs to the genus *Yllenus* SIM. and most probably to the *arenavarius* group. However, the features represented on SAITO's original drawing (fig. 185) show that it cannot be conspecific with the European *Yllenus arenavarius* MENGE.

According to information received from Dr. S. SAITO, the specimen he described was destroyed together with his other collections during the Second World War.

“*Yllenus*” *brueggeri* LEBERT, 1887

In spite of careful searching, I have not been able to see neither the type nor any other specimens of this species. Most probably it does not belong to the genus *Yllenus* SIM.

“*Yllenus*” *starmuehlneri* ROEWER, 1955

Material: “*Yllenus starmuehlneri* ROEWER Type. Choramabad. Iran. leg. F. STARMÜHLNER” — ♂ ♀ — syntypes (SMF-Frankfurt a. M.).

Apart from the superficial resemblance of its broad flattened copulatory organ to the drawings of SIMON, this species has nothing in common with the genus *Yllenus* SIM., nor with the subfamily *Sitticinae*.

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STRESZCZENIE

Autor omawia 22 gatunki należące lub włączane w pewnych okresach do rodzaju *Yllenus* SIMON, 1868. Spośród nich 5 gatunków jest opisanych jako nowe dla nauki. Oprócz dokładnych opisów morfologicznych poszczególnych gatunków autor analizuje cechy systematyczne oraz różnice i podobieństwa omawianych gatunków, a także ich stanowisko systematyczne. Autor stwierdza istnienie trzech odrębnych, lecz niewątpliwie blisko spokrewnionych grup gatunków w obrębie rodzaju i nazywa je grupami *hamifer*, *alboincinctus* i *arenarius*, powstrzymuje się jednak od nadawania im sprecyzowanej rangi systematycznej.

Stwierdzając brak zasadniczych różnic systematycznych, autor włącza do rodzaju *Yllenus* SIM. obydwa gatunki z rodzaju *Pseudomogrus* SIM. i część gatunków z rodzaju *Attulus* SIM. Autor stwierdza konieczność dalszych badań nad rodzajem *Yllenus* SIM.

РЕЗЮМЕ

Автор рассматривает 22 вида пауков, принадлежащих к роду *Yllenus* SIMON, 1868 или включаемых в этот род в некоторые периоды времени. Пять видов являются новыми для науки. Кроме подробного морфологического описания отдельных видов автор дает анализ систематических признаков, а также различий и сходств рассматриваемых видов, как и их систематического положения. Автор констатирует существование в пределах рода трех различающихся, но несомненно близкородственных групп видов и дает им названия: группа *hamifer*, *alboincinctus* и *arenarius*, воздерживаясь, однако, от определения их систематической категории.

Оба вида из рода *Pseudomogrus* SIM. и часть видов из рода *Attulus* SIM. автор включает в род *Yllenus* SIM., констатируя отсутствие существенных систематических различий. Автор подчеркивает необходимость дальнейших исследований рода *Yllenus* SIM.

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