

THE NEPHILINAE SPIDERS OF THE NEOTROPICS (ARANEAE: TETRAGNATHIDAE)

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ABSTRACT. The spider genera *Nephila* and *Nephilengys* belong to the family Tetragnathidae. There are three species of nephilines in the Neotropical region: *Nephila clavipes* from south-eastern United States to northern Argentina, *Nephila sexpunctata* in Brazil, Paraguay and northern Argentina, and the introduced *Nephilengys cruentata* which is commonly found in Brazil associated with man, making its web on buildings.

KEY-WORDS. Nephilinae spider systematics; neotropical spiders; Araneae: Tetragnathidae.

INTRODUCTION

In 1912 F. Dahl revised the large *Nephila* spiders worldwide, without a single illustration. He reported only two species for America and stated that he could not find any specimens that matched Giebel's description of a species from Mendoza, Argentina. Giebel's specimen has now been reexamined and found to be the same as *Nephila*-sp. which has in recent years been found in southern Brazil and Paraguay and raised in the laboratory of the Seção Artrópodos Peçonhentos of the Instituto Butantan.

The catalogs of Roewer and Bonnet and many recent publications place *Nephila* in the Araneidae. But now that specimens have been reexamined, *Nephila* is found to have derived characters shared with members of the family Tetragnathidae.

MATERIAL AND METHODS

Specimens have come from numerous institutions and we would like to thank their curators for making the collections available. They are:

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AMNH, American Museum of Natural History, New York, NY, U.S.A., N.I. Platnick.

BMNH, British Museum, Natural History, London, England, P. Hillyard.

FMNH, Field Museum of Natural History, Chicago, IL, U.S.A.

IB, Instituto Butantan, São Paulo, Brazil.

MACN, Museo Argentino de Ciencias Naturales, Buenos Aires, Argentina, E. Maury.

MCN, Museu de Ciências Naturais, Fundação Zoobotânica, Porto Alegre, Brazil, A.A. Lise.

MCZ, Museum of Comparative Zoology, Cambridge, MA, U.S.A.

MEG, Maria Elena Galiano, Buenos Aires, Argentina.

MLU, W.B. Zoologie, Martin-Luther-Universität, Halle (Saale), D. Heidecke.

MNRJ, Museu Nacional, Rio de Janeiro, Brazil, A. Timotheo da Costa.

MRAC, Musée Royal de l'Afrique Centrale, Tervuren, Belgium, R. Jocqué.

MZSP, Museu de Zoologia, Universidade de São Paulo, São Paulo, Brazil, J.L.M. Leme.

ZMB, Zoologisches Museum, Humboldt Universität, Berlin, DDR Germany, M. Moritz.

We thank Linden Higgins, who found a specimen of *N. sexpunctata* in the Field Museum. Peter Sacher helped locate the specimen of Giebel in the Halle (Saale) collection. M.T. Nogueira and M. Costa assisted in raising *N. sexpunctata* in the laboratory. NSF grants BSR 83-12772 and BSR 85-13842 to H.W.L. made trips to Brazil possible.

Nephilinae Simon

Nephiliae Simon, 1894: 749

Diagnosis. Unlike other tetragnathids, nephilines have the labium longer than wide, transverse grooves on the booklung covers, and the metatarsi and tarsi together longer than the patellae and tibiae. The carapace is truncate in front, the eyes region narrower than the head, as in *Leucauge*, and the median ocular quadrangle is square. In American species there is great diversity in size between males and females. While these characters hold for the three American species, unfortunately they do not for other nephilines (Levi and Coddington, in prep.)

Relationships. *Nephila* is usually placed in the Araneidae. This placement is incorrect as *Nephila* does not have any of the synapomorph characters of the Araneidae. On the other hand, *Nephila* species have certain apomorph tetragnathid characters:

- 1) the male palpus has a spherical tegulum with apical sclerites;
- 2) the male palpus lacks the median apophysis and radix;
- 3) the embolus of the male palpus is wrapped by the conductor;
- 4) a prominent tarsal organ is present on the cymbium (Levi and Coddington in prep.);
- 5) the paracymbium of the male palpus is often a free sclerite.

Key to Neotropical Nephilinae

1. Female 2
- Male 4
- 2(1). Underside of abdomen with 4 white patches on black (Fig.24); carapa-

- ce with some short macrosetae (Fig. 25); epigynum with transverse groove between two hemispherical bulges (Fig. 21); Brazil
- *Nephilengys cruentata*
- Underside of abdomen marbled (Fig. 15); carapace with white setae (Fig. 14); epigynum otherwise 3
- 3(2). Abdomen narrow with overhang above spinnerets; two horns present on female carapace (in range of the two sympatric species); epigynum with a wide dark groove (Fig. 4); southeastern United States to northern Argentina *Nephila clavipes*
- Abdomen oval, not overhanging spinnerets (Figs. 14,15); female carapace without horns; epigynum is an oval depressed plate with a groove on each side into an anterior opening (Figs. 10,11); Brazil and Paraguay, northern Argentina *Nephila sexpunctata*
- 4(1) Palpus with conductor and embolus short, forming a distal coil (Figs. 16-18), Brazil *Nephilengys cruentata*
- Palpus with conductor and embolus forming a filiform projection (Figs. 1,2,5,6). 5
- 5(4) Abdomen without dorsal scutum; length of projecting embolus and conductor about 1.5 times length of palpal bulb (Figs. 1,2); southeastern United States to northern Argentina *Nephila clavipes*
- Abdomen with dorsal scutum (Figs. 8,9); length of projecting embolus and conductor about 2.2 times length of bulb (Figs. 5,6); Brazil and Paraguay, northern Argentina. *Nephila sexpunctata*

Nephila Leach

Nephila Leach. 1815:133. Type species by monotypy: *Nephila maculata* (Fabricius). The name is feminine in gender.

Diagnosis. The underside of the female abdomen is usually marbled (Fig. 15), never with four white patches. The carapace of the female is covered with setae (Fig. 14), the legs are longer than those of *Nephilengys* species and the conductor and embolus form a straight projection at right angle to the axis of the palpus. (Figs. 1,2,5,6)

Nephila clavipes (Linnaeus)

Figures 1-4

Aranea clavipes Linnaeus, 1767: 1034. Name given to specimens from Jamaica illustrated by P. Browne, 1756: 419, pl. 44, fig. 4.

Nephila clavipes: — Levi, 1980: 17, figs 23-43, female, male, map 2. References to illustrated literature. Robinson and Robinson, 1980.

Note. The illustrations (Fig.4) were made from a female from Paraguay, a male (Figs.1-3) from Argentina.

Distribution: Southeastern United States to northern Argentina. Southernmost records: PARAGUAY: *Caazapá*: Buena Vista, female (D. Wees, MCZ). ARGENTINA: *Misiones*: numerous records (MEG and MACN). *Jujuy*: Yuto, El Pantanosa, March 1967, male (MEG). *Salta*: Cabacal, female (MACN).

Nephila sexpunctata Giebel
Figures 5-15; Plate 1

Nephila sexpunctata Giebel, 1867:325. Female holotype from Mendoza (Argentina) in MLU examined and labeled. Bonnet, 1958: 3084.

Nephila chacoensis Badcock, 1932: 16, fig. 11, female, male. Female, male syntypes from Makthlawaiya [23°25'S, 58°19'W], Paraguay in BMNH, examined. Bonnet, 1958: 3068. NEW SYNONYMY.

Nephila dubia Badcock, 1932: 17. Two immature syntypes, 13 mm total length, from Nanahua (23°30'S, 59°30'W), Paraguay in BMNH, examined. Roewer, 1942: 933. NEW SYNONYMY.

Note. Roewer's Katalog (1942) lists *N. sexpunctata* erroneously as a synonymy of *N. clavipes vespucea* (Walckenaer). It does not list *chacoensis*. D. Heidecke sent H.W.L. five unlabeled *Nephila* from their collection for examination and one of them matched Giebel's description in all details and measurements. It now has been labeled. The name *sexpunctata* refers to the six dark spots, one pair in the groove between head and thorax, and two more pairs on the sides of the thorax, more visible in living than in preserved specimens.

Description. Female (living). Carapace dark orange to brown, edge of thorax lighter orange, covered by dense, silver down; ocular area dark, hairless. Chelicerae blackish-brown. Labium and endites dark brown with distal edge light orange. Sternum orange with dark brown marks (Fig. 15). Coxae ventrally orange with anterior and posterior sides dark brown. Legs dark orange, two distal articles darker to black; legs III and IV blackish at distal end of femur, patella and tibia; first tibia with a scanty brush of dark hairs, weaker on tibiae II and IV and lacking on tibia III. Abdomen with a marble-like color pattern, dark gray to silvery; dorsum blackish at anterior, with an anterior whitish patch followed by five pairs of white spots in the median line and diagonal marbelized bands (Fig. 14); venter with a rectangular blackish patch behind the epigastric furrow and a many-sided one in front of the spinnerets, conspicuous in immature females but camouflaged in the adults, otherwise mottled dark on light; a transverse whitish stripe posterior to the epigynum; epigastric area dark with a yellow to white bar edging the book-lungs; posterior tip of abdomen darker. Thoracic depression with an upside down U-shaped mark. Posterior median eyes 0.9 diameter of anterior medians, anterior laterals, 0.9 diameter, posterior laterals 0.8. Anterior median eyes 1.5 diameters apart, posterior median eyes 2.5 diameters apart. Height of clypeus equal to 3.5 diameters of anterior median eyes. Chelicerae with three teeth on anterior margin, four on posterior. Abdomen elongate oval (Fig. 14, 15). Total length 32mm. Carapace 12.1 mm long, 7.7 wide. First femur 16.4 mm, patella and tibia 15.7, metatarsus 17.4, tarsus 3.6. Second patella and tibia 13.6 mm, third 7.1, fourth 10.3.

Male. Carapace orange-black, lightest on head, thoracic margin and on median line or all dark. Chelicerae blackish brown. Sternum black with median light longitudinal band. Coxae, legs light orange; legs I and II blackish on distal end of femur, patella and distal half of tibia. Dorsum of abdomen with shiny, dusky orange scutum, with two pairs of indistinct dusky patches, margins darker (Figs. 8, 9); venter with white pigment line on each side, dusky in between, a dark dusky patch near the spinnerets, epigastrum

dark with a yellow triangle on each side, well marked in living males. Secondary eyes 0.7 diameter of anterior medians. Anterior median eyes 0.7 diameter apart, 0.4 from laterals. Posterior median eyes their diameter apart, their diameter from laterals. Sternum convex. Palpal patella with one seta. Endite swollen at base on each side. Legs with a few long macrosetae; abdomen with near parallel sides, rounded in front and behind and with a scutum. Total length 2.8 mm. Carapace 1.4 mm long, 1.1 wide. First femur 1.8 mm, patella and tibia 1.7, metatarsus 1.9, tarsus 1.0. Second patella and tibia 1.5 mm, third 0.8, fourth 1.1.

Variation. Immatures with brighter color pattern, orange-brown to silvery; sternum of immature females with a white longitudinal band, as in the males. The abdomen of males varies in length (Figs. 8, 9).

Diagnosis. Females are larger than those of *N. clavipes* and the abdomen is more oval, less cylindrical (Figs. 14, 15). The ventral abdominal mottled markings (Fig. 15) and the deep dark pit on each side of the epigynum (Figs. 10, 11) are diagnostic. Males have dark carapaces while those of *N. clavipes* males are bright yellow, and the embolus and surrounding conductor is more than twice as long as the length of the bulb (Figs. 5, 6) while those of *N. clavipes* are about 1.5 times the length of the palpal bulb.

Natural History. In March, 1986, V.R.E. received a preserved nephilinae from Cuiabá (Mato Grosso) to be identified. It was neither *Nephila clavipes* nor *Nephilengys cruentata*, the two species of this group known in Brazil. The spider was sent then to H.W.L., who concluded that it was conspecific with one he had seen from Paraguay some time before and that it would be necessary to get adult males to ascertain the correct identification of the species. A living female of the same species from Ibitinga (São Paulo) was donated to Butantan in April, 1986 and two days after its arrival an egg sac was found in the web. Two months later, as the spiderlings had not emerged and the mother had died a small hole was made in the egg sac and some spiderlings were removed to be raised. On the three occasions when this was done, the remaining spiderlings inside the cocoon closed the hole afterwards. None of the 40 isolated individuals survived. The remainder spiderlings emerged by themselves after 253 days from the egg sac construction (more than eight months!), and two adult males were obtained. One of them was sent to HWL, who identified the species eventually as *Nephila sexpunctata* Giebel. In August, 1987 M.T. Nogueira (Butantan) went to Ibitinga in search of more specimens; after an exhaustive inspection she only found four egg sacs of the species. Two males, one female and two cocoons were available from a second going (April, 88); several spiderlings were raised in the laboratory, some up to adulthood.

The available Brazilian females were collected in February and April. Males have matured in the laboratory from November to February. The specimen from Cuiabá was found in a web on the walls of a building. In Ibitinga, two different situations were noticed: 1) spiders next to houses with snares constructed under eaves and cocoons tied to roof shingles; 2) specimens with snares built between mango and guava trees, bamboo, eucalyptus or a native Apocynaceae (*Peschiera* sp. = "leiteira"), mostly up to five meters high and some higher; egg sacs fastened to the branches. The egg sac of *N. sexpunctata* is very characteristic: it is hat-shaped with a flat bottom (3,5 cm) and a very convex cover (3,0 cm); the walls, of a whitish closely woven silk, are covered by yellow threads and thicker brown ribbons

of silk by which the egg sac is tied. In nature, the cocoons remain generally hidden by leaves. The *N. sexpunctata* web is a near vertical orb, with a large free zone and an entire hub where the spider rests, head down, on the lowerside. In the laboratory cages, immatures construct an orb (Plate 1) with a barrier web on each side, consisting of oblique silken threads, irregularly placed. The web of an adult female found in the field was 80 cm overall, the orb measuring about 50 cm in diameter; unlike the webs of immatures, the silken threads were yellow and no barrier web was present. The exuviae and remains of preys are stored in a row near and above the hub (10-15 *Musca* sp., *Drosophila* sp. and *Ceratites* sp. were counted in a cage-built web)

Distribution. Brazil, Paraguay to northern Argentina.

Records. BRAZIL. *Mato Grosso:* Cuiabá, female (IB). *São Paulo:* Ibitinga, 2 females, 10 males, several immatures and egg-sacs (IB). PARAGUAY. *Dpto. Central:* Villeta, Feb-March 1983, 1 female (L. Fogarty, MCZ). ARGENTINA. *Misiones:* (without locality), 1 female (FMNH). *Formosa:* Formosa, March 1981, 1 female (P. Jorgensen, MCZ). *Corrientes:* (without locality) 1 female (MACN).

Nephilengys L. Koch

Nephilengys L. Koch, 1872: 144. Type species designated by Bonnet, 1958: *Nephila schmeltzi* L. Koch (= *N. malabarensis* (Walckenaer), the first species cited by Koch. The name is feminine in gender.

Diagnosis. The underside of the female abdomen has four white patches (Fig. 24). The carapace of the female bears some short macrosetae (Fig. 23); the legs are shorter than those of *Nephila* species and the conductor and embolus of the male palpus are more complex, having a twist at the tip (Fig. 16, 17).

Nephilengys cruentata (Fabricius)

Figures 16-25; Plate 2

Aranea cruentata Fabricius, 1775: 439. Specimens from Rio de Janeiro in the Banks collection, in BMNH, lost (Zimsen, 1964.)

Epeira diadela Walckenaer, 1841: 54. Specimens from Rio de Janeiro, lost.

Epeira brasiliensis Walckenaer, 1841:101. Specimens from Brazil, lost.

Epeira azzara Walckenaer, 1841:102. Specimens from Brazil, lost.

Nephilengys genualis Gerstaecker, 1873:502. Female holotype from Mombas, (Mombassa, Kenya), in ZMB, examined by M. Moritz and compared to our illustrations.

Nephila instigans Butler, 1876:442. Female holotype from Rodriguez, Mascarene Islands, Indian Ocean, in BMNH, not examined.

Nephilengys borbonica var. *mossambicensis* Karsch, 1878:319. Female from Mozambique in ZMB, examined by M. Moritz and compared to our illustrations.

Nephila brasiliensis: Bertkau, 1880:83, pl. 2, fig. 29, female.

Nephilengys cruentata: Lenz, 1891:20, pl. 2, fig. 19 male. Dahl, 1912:47, 48, 77, 79. Lessert, 1936:244, fig. 39, male. Roewer, 1942:933.

Benoit, 1963:368. Robinson and Robinson, 1973, 1980. Schmidt and Jocqué, 1986: 206, figs. 10, 11, female, male.

Nephila cruentata chiloangensis Strand, 1920:109. Female from Chioloango (Angola), not in MRAC, lost.

Nephila cruentata: Bonnet, 1958: 3071.

Note: Dahl's (1912) revision synonymized the names of various species described previously with those of *N. cruentata*. However Schmidt and Jocqué (1986) convincingly showed that Benoit (1963) was right and *Nephilengys borbonica livida* (Vinson, 1863) from the Comoro Islands is in fact a distinct species.

Common name: in Brazil, mostly in Rio de Janeiro, this species is known as Maria Gorda (Fat Maria), Maria Preta (Black Maria) and Maria Bola (Ball Maria).

Description. Female. Carapace dark red-brown. Chelicerae, labium, endites dark brown. Sternum orange, margin dark. Coxae dark brown. Legs orange with brown rings. Dorsum of abdomen mottled black on gray, darkest in midline (Fig. 23); sides with white bands from anterior dorsal to posterior ventral, dark between; venter black with two pairs of white spots, another pair on sides (Fig. 24). Carapace with thoracic depression a transverse groove. Secondary eyes 0.8 diameter of anterior medians. Anterior median eyes 1.5 diameters apart, 3.5 laterals. Posterior median eyes four times their diameter apart, five from laterals. Lateral eyes separated by 1.5 their diameter. Abdomen oval. Total length 23mm. Carapace 9.5mm long, 7.5 wide. First femur 11.5mm, patella and tibia 11.8, metatarsus 12.7, tarsus 2.8. Second patella and tibia 10.7mm, third 6.4, fourth 9.4.

Male. Carapace light orange. Chelicerae, labium, endites, orange. Sternum orange. Legs light orange. Abdomen grayish orange with silver spots under the integument, spots densest anterior on dorsum. Carapace without thoracic depression. Secondary eyes 0.5 diameter of anterior medians. Anterior median eyes 0.8 their diameter apart 0.8 from laterals. Posterior median eyes slightly less than two of their diameter apart, two from laterals. Palpal patellae with one seta, endites without tooth. First coxae without hook. Second tibiae as thick as first. Abdomen oval, pointed behind (Fig. 20). Total length 4.1mm. Carapace 2.2mm long, 1.6 wide. First femur 2.6mm, patella and tibia 2.9, metatarsus 3.3, tarsus 1.2. Second patella and tibia 2.4mm, third 1.3, fourth 1.9.

Living specimens have crimson sternum, ventral patches of light yellow.

Variation. Total length of American females 16 to 30mm, of males 3.5 to 4.7. Specimens from Madagascar have the sternum black, those from the Mascarene islands have a transverse light band on the sternum (Dahl, 1912). Color photographs of an East African specimen showed the color of the sternum to be yellow. American females vary in the color of the dorsum of the abdomen: black in some individuals, silver in others, often speckled black on white. Specimens collected in dark places (under bridges) and in colder regions are darker in color, while the ones from sunny and open places have a silver-gray dorsum. Early instars are much lighter than penultimate and adult females. In females, the length of the transverse groove of the epigynum varies; in some individuals it is as long as wide, in other it is much longer than wide.

Diagnosis. This species differs from the related *N. malabarensis* (Wal-

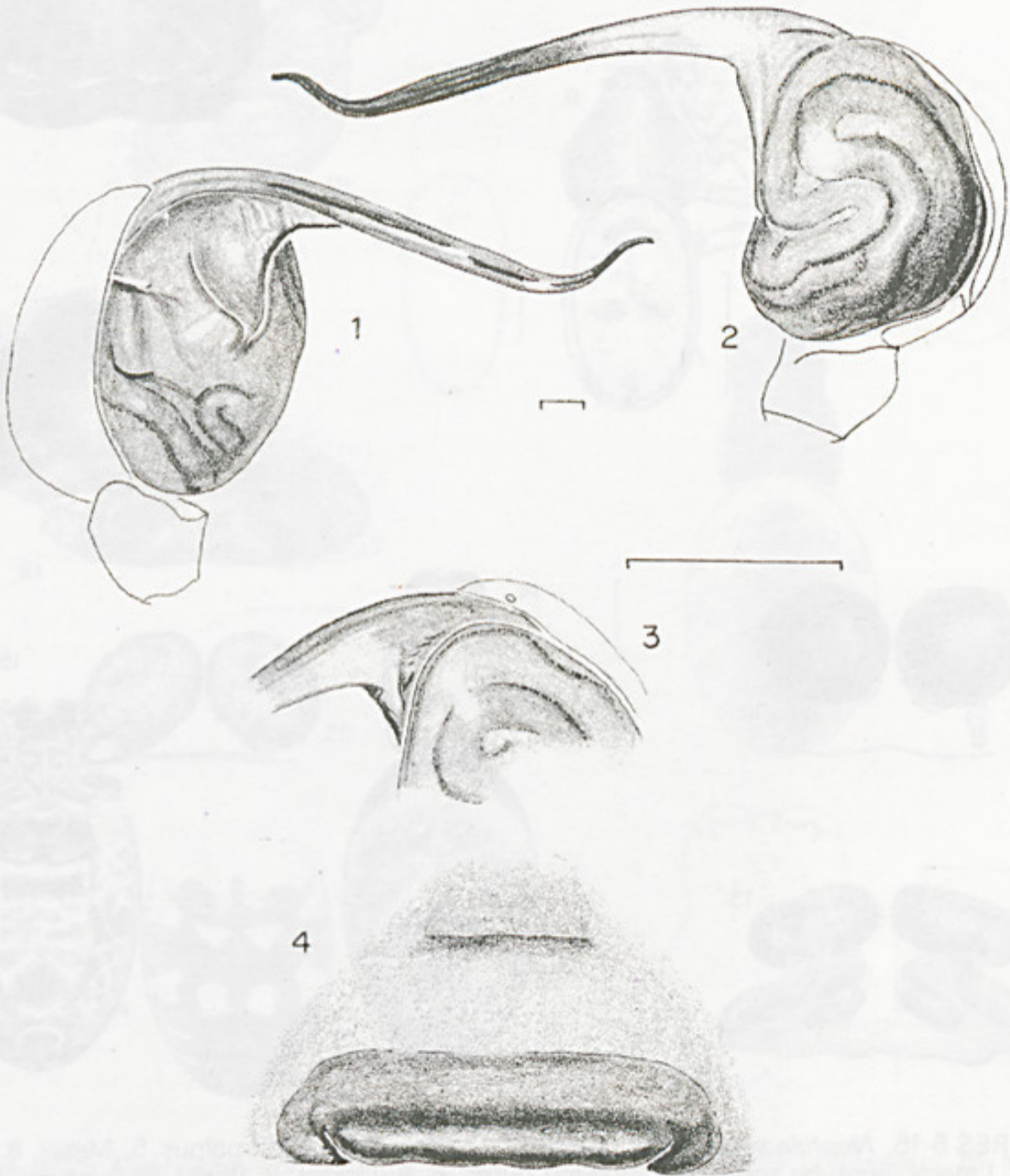
kenaer, 1841) by the shape of the genitalia. The epigynum of *N. cruentata* has a transverse groove with a spherical swelling at each end and a posterior keel (Fig. 21). The epigynum of *N. malabarensis* is variable, with two touching transverse swellings in middle, or a median anterior septum fused to a posterior swelling. The palpus of the male *N. cruentata* has a short coiled embolus enclosed in the conductor (Figs. 16-24). In *N. malabarensis*, the conductor and embolus project, shorter than in *Nephila* species but longer than in *N. cruentata*. Differences from the Indian Ocean species *N. borbonica livida* were illustrated recently by Schmidt and Jocqué (1986).

Natural History. Most information on behavior and ecology comes from Robinson and Robinson (1973, 1980) and from Ades, Japyassú and Neiman (1986 and personal communication). The life cycle of *N. cruentata* of São Paulo has been studied by Bauab-Vianna (1970). Both species of *Nephilengys* but especially *N. cruentata* are commensals with humans. The web of spiderlings is a perfect, almost symmetrical orb, with the spider at the center. In later stages of development, a gradual change in web structure takes place, the spider constructs a retreat in the region of the hub. This retreat, initially represented by a thin and vault-like tangle of dried silk, is progressively reinforced and displaced to the upper edge of the web. Finally, the spider builds an incomplete orb with a long tubular retreat placed above the web (Plate 2). This retreat is not renewed periodically as are other parts of the web and can be occupied, opportunistically, by other females of the species (Ades *et al.*, 1986). The web is most frequently found on buildings, 2 to 4m high, especially under eaves and porch roofs. The retreat is usually placed in a dark and protected corner. Robinsons observed that the natural habitat is trunks of medium to large trees, the retreat against the bark, the web aerial beneath a large side branch. The spider rests head down in the retreat in several positions, either with flexed legs or with legs extended in a characteristic, alert position. Egg sacs, which consist of a conglomerate of eggs surrounded by a fluffy layer of silk, are normally found near the retreat. In both species, as in the related genus *Herennia*, some males may be eunuchs; after mating they amputate the cymbium and bulb from their palpal tibia and defend the female against other suitors. Courting males fight in the web; eunuchs stay near the outer surface of the retreat. Robinsons observations were made in Africa and India, but eunuchs have also been found in collections from Brazil. Males with the whole palpus broken off have also been observed by Janet Edmunds in West Africa (personal communication, 1980).

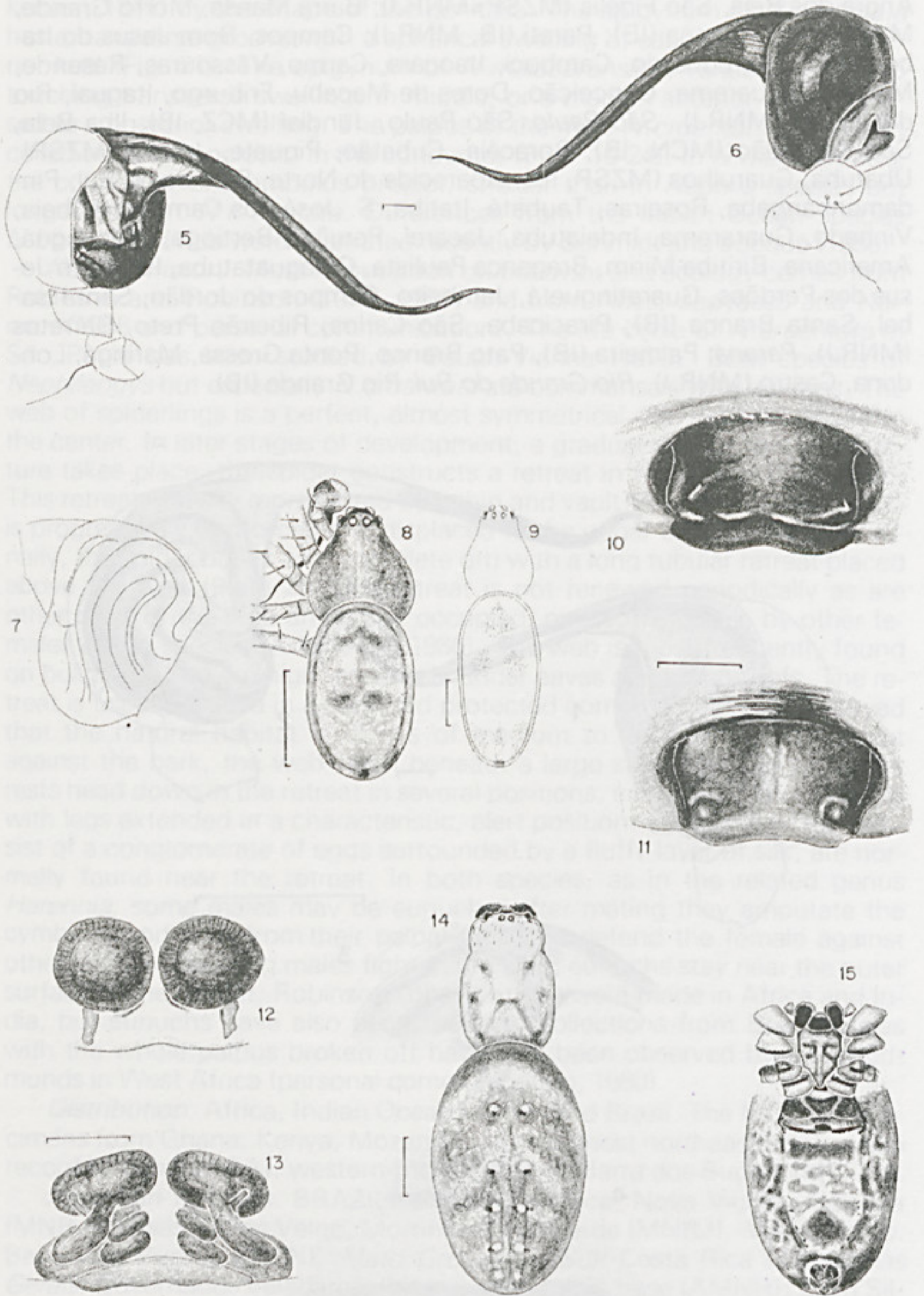
Distribution. Africa, Indian Ocean Islands and Brazil. The MCZ has specimens from Ghana, Kenya, Mozambique. The most northeastern Brazilian record is Valença (BA); western-most locality is Barra dos Bugres (MT).

American Records. BRAZIL. *Bahia:* Alcobaça, Nova Viçosa, Valença (MNRJ). *Goiás:* Goiás Velho, Morrinhos, Rio Verde (MNRJ). *Mato Grosso:* Barra dos Bugres (MCN). *Mato Grosso do Sul:* Costa Rica (IB). *Minas Gerais:* Governador Valadares, Ibituruna mountain base (AMNH); Dom Silveiro, Mendanha (MCN); Ouro Preto, Prados (MZSP); Sereno, Rio Acima, S. João Del Rei, Paraisópolis, Extrema (IB); Além Paraíba, Manhuaçu, Tombos, Juiz de Fora, Viçosa, Ubá, Formiga, Lavras, Nepomuceno, Conselheiro Lafaiete, São Lourenço, Pedro Leopoldo, Caeté (MNRJ). *Espírito Santo:* Castelo, Colatina, Linhares, (MNRJ). *Rio de Janeiro:* Petrópolis (AMNH); Rio de Janeiro (AMNH, MCZ, MCN, MNRJ); Mendes (MZSP);

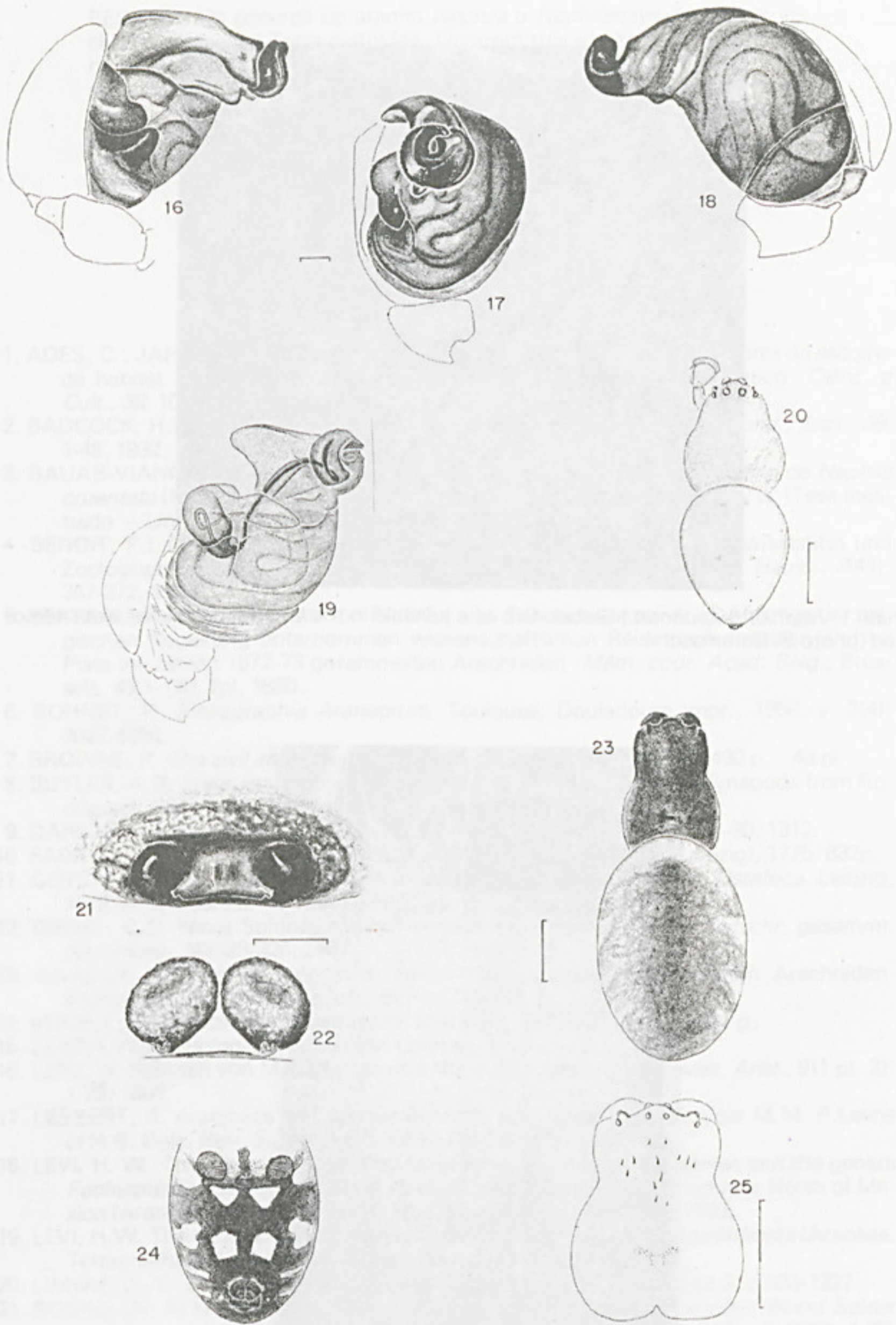
Angra dos Reis, São Fidélis (MZSP, MNRJ); Barra Mansa, Morro Grande, Marquês de Valença (IB); Parati (IB, MNRJ); Campos, Bom Jesus do Itabopoana, São Eduardo, Cambuci, Itaocara, Carmo, Vassouras, Resende, Maricá, Saquarema, Conceição, Dolores de Macabu, Friburgo, Itaguaí, Rio das Flores (MNRJ). *São Paulo*: São Paulo, Jundiaí (MCZ, IB); Ilha Bela, São Sebastião (MCN, IB); Boracéia, Cubatão, Piquete, Juquiá (MZSP); Ubatuba, Guarulhos (MZSP, IB); Aparecida do Norte, Paraíba do Sul, Pindamonhangaba, Roseiras, Taubaté, Itatiba, S. José dos Campos, Atibaia, Vinhedo, Guararema, Indaiatuba, Jacareí, Peruíbe, Bertioga, Mongaguá, Americana, Biritiba Mirim, Bragança Paulista, Caraguatatuba, Itu, Bom Jesus dos Perdões, Guaratinguetá, Jambeiro, Campos do Jordão, Santa Isabel, Santa Branca (IB); Piracicaba, São Carlos, Ribeirão Preto, Barretos (MNRJ). *Paraná*: Palmeira (IB), Pato Branco, Ponta Grossa, Maringá, Londrina, Castro (MNRJ). *Rio Grande do Sul*: Rio Grande (IB).



Figures 1-4, *Nephila clavipes* (Linnaeus) 1-3. Male, left palpus. 1. Mesal. 2. Lateral. 3. Lateral, showing round tarsal organ on cymbium. 4. Female epigynum. *Scale lines*. Male 0.1 mm, female 0.5 mm



FIGURES 5-15. *Nephila sexpunctata* Giebel. 5-9. Male. 5-7. Left palpus. 5. Mesal. 6. Lateral. 7. Lateral, syntype specimen showing ducts. 8, 9. Dorsal. 8. Brazil. 9. Syntype. 10-15. Female. 10-13. Epigynum. 10. Villeta, Paraguay. 11. Syntype. 12. Dorsal view, cleared. 13. Posterior view, cleared. 14. Dorsal. 15. Posterior.
Scale lines. Figures 6-7, 0.1 mm. Figures 8, 9, 1.0 mm. Figures 10-13, 0.5 mm. Figures 14, 15, 5.0 mm.



Figures 16-25. *Nephilengys cruentata* (Fabricius). 16-20. Male. 16-19. Left palpus. 16. Mesal. 17. Ventral. 18. Lateral. 19. Expanded and cleared, showing duct. 20. Dorsal. 21-25. Female. 21. Epigynum. 22. Epigynum, dorsal. 23. Dorsal. 24. Abdomen, ventral, 25. Carapace. Scale lines. Figures 16-19, 0.1 mm. Figure 20, 1.0 mm. Figures 21, 22, 0.5 mm. Figures 23-25, 5.0 mm.

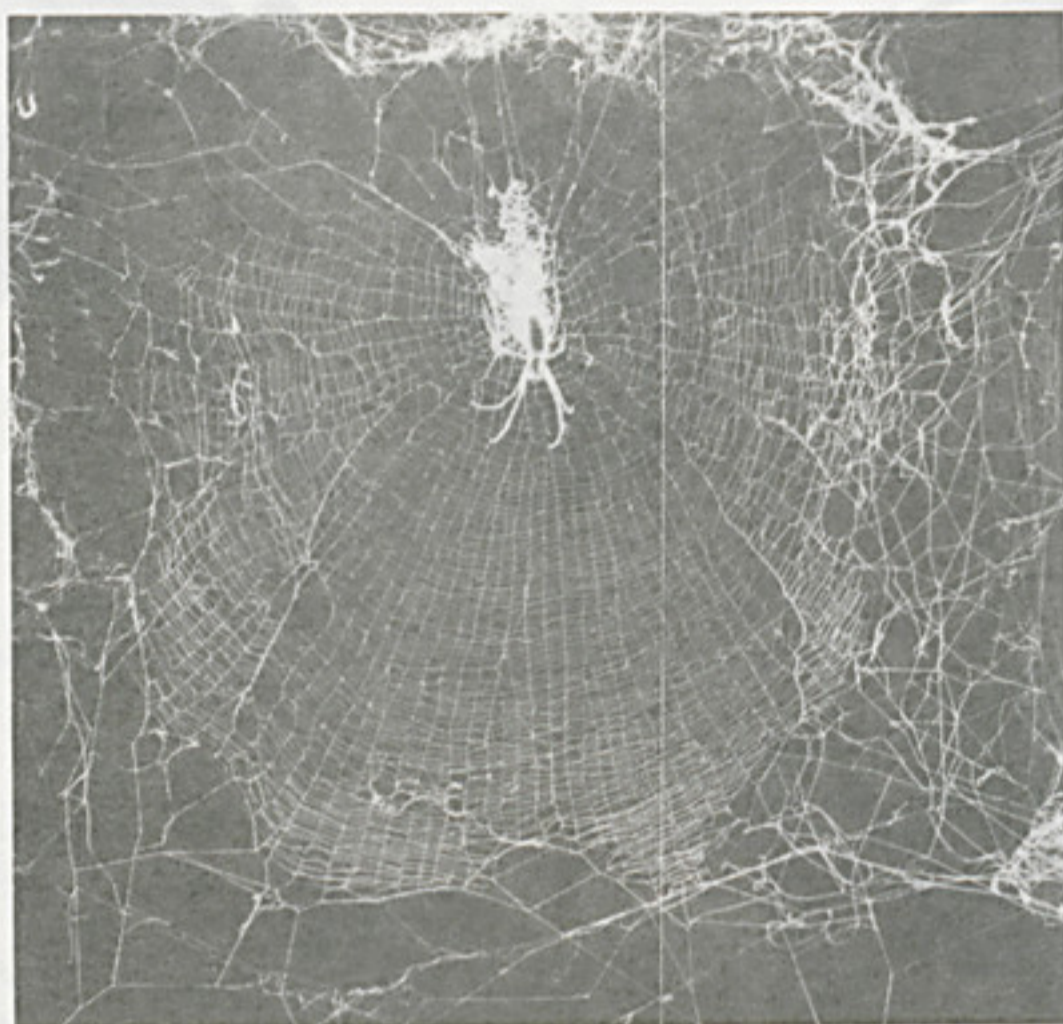


Plate 1. *Nephila sexpunctata* Giebel. Orb of a juvenile in the laboratory; barrier webs removed (photo S. Caramaschi).



Plate 2. *Nephilengys cruentata* (Fabricius). Web from Jardim Botânico, Rio de Janeiro, horizontal diameter 40-50 cm, retreat on wall near hub.

LEVI, H. W. & EICKSTEDT, V. R. D. Von. The Nephilinae spiders of the neotropics (Araneae: Tetragnathidae). *Mem. Inst. Butantan*, 51 (2):43-56, 1989.

RESUMO: Os gêneros de aranha *Nephila* e *Nephilengys* devem ser incluídos na família Tetragnathidae. Ocorrem três espécies de Nephilinae na região neotropical: *Nephila clavipes*, do sudeste dos Estados Unidos ao norte da Argentina; *Nephila sexpunctata* no Brasil, Paraguai e norte da Argentina e *Nephilengys cruentata*, espécie introduzida, comumente encontrada no Brasil associada ao homem.

UNITERMOS: Sistemática de aranhas Nephilinae; aranhas neotropicais; Araneae: Tetragnathidae.

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