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Notes on African Linyphiidae (Araneae) III. The genus *Tybaertiella*, with the description of a new species of *Pelecopsis*

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Summary

The strictly African genus *Tybaertiella* Jocqué is revised and an identification key for the species is given. These appear to be very variable and the numerous nominate species and subspecies are reduced to three. They are diagnosed and their variation is described. Notes on their biology are provided. *Pelecopsis tybaertielloides*, a new species intermediate between *Tybaertiella* and *Pelecopsis*, is described.

Introduction

The genus *Tybaertiella* was described by Jocqué (1979) for two species from Ivory Coast: *T. peniculifer* and *T. minor*, the former being the type species of the genus. Independently, but almost simultaneously, Holm (1979) described a new genus (*Locketia*) in his revision of the *Trichopterna-Pelecopsis* complex. This genus proved to be identical with *Tybaertiella*. In his revision, Holm (loc. cit.) mentioned two species from Nigeria, to be described by Locket & Russell-Smith (1980): *L. bicolor* and *L. minor*. The Nigerian species turned out to be identical with the Ivorian ones and were subsequently synonymised by their authors (Locket & Russell-Smith, 1981), a remarkable coincidence being that the smaller species had independently been given the same name by Jocqué (1979). Locket & Russell-Smith (1980) remarked that *Locketia minor* might well be a slightly different form of *Lophocarenum bacelarae* Caporiacco of which Miller (1970) had already described a subspecies: *Pelecopsis bacelarae dundoensis*. Slightly aberrant forms of *Pelecopsis bacelarae* were also described by Locket (1974) and Holm (1979).

While preparing a revision of African *Araeoncus*, I found that *Araeoncus kruegeri* Simon 1894 is in fact a representative of the genus *Tybaertiella*. The vial in the collection in the Museum national d'Histoire naturelle, Paris, contains two specimens of different size but with fairly similar palps. It is impossible to know which one was described by Simon and whether both specimens came from the same locality. In view of the differences that exist between the specimens these questions may seem of importance. But since they most likely belong to the same species, as will be shown hereafter, the smaller one was arbitrarily selected as lectotype. It is remarkable though that Simon, without knowledge of the variability of the species, identified them as the same. Further study of specimens from many parts of Africa indeed revealed that *Araeoncus kruegeri* Simon, *Lophocarenum bacelarae* Caporiacco, *Tybaertiella minor* Jocqué and probably *Pelecopsis bacelarae dundoensis* Miller and *Pelecopsis (?) nonindurata* Miller, all belong to the same variable species. Although the bulbus of the male palp is very similar in all specimens, the shape of the male palpal tibia, the position and size of the eyes, as well as the relative length of the leg segments, vary to a considerable extent. This must account for the large number of synonyms and the confusion that exists concerning the identity of isolated specimens (Locket, 1974; Holm, 1979).

As a result of these studies only three species now remain in the genus *Tybaertiella*, namely *peniculifer*, *kruegeri* and *convexa*.

Genus *Tybaertiella* Jocqué, 1979

Tybaertiella Jocqué, 1979: 752.
Locketia Holm, 1979: 274.

Diagnosis

The diagnosis of the genus given by Holm (1979) is very accurate and will be repeated here though slightly modified. Small to medium-sized erigonine spiders of the *Pelecopsis* group. Head slightly or moderately raised with posterior median eyes at highest point; sometimes with postocular sulci. Sternum with posterior projection broad and truncate, separating posterior coxae by more than their diameter. Chelicerae with stridulatory ridges. Legs: length sequence IV, I, II, III. Patellae and tibiae without spines. Length of tibia I 4.5-8.9 times its diameter. Metatarsi with a trichobothrium in proximal half; Tm I 0.32-0.50. Anterior claws of all tarsi with minute comb teeth. Abdomen with a dorsal scutum in male only, venter with sclerotised areas. Palp:

tibiae in male and female with 2 trichobothria. Patella not or slightly longer than half length of femur (ratio 0.45-0.54). Male palpal tibia with two dorsal apophyses with a more or less deep indentation between them. Paracymbium simple, without hairs. Radical part of embolic division directed antero-laterally. Embolus long, broad at base and making a complete turn before continuing along mesal margin of cymbium. Inner side of embolus membranous. A protegulum is present but no protegular basis. Conductor membrane complex and narrow, arising from middle of distal part of suprategulum and consisting of a radical and a suprategular membrane.

Distribution

The genus is entirely African and is found throughout the continent south of the Sahara.

Type species

Tybaertiella peniculifer Jocqué by original designation.

Identification key

1. Tegument of carapace and sternum finely reticulated; ♂ with raised cephalic area and postocular sulci; ♀, sclerotised section of copulatory duct situated behind spermathecae . . . . . *T. convexa* (Holm)

– Tegument of carapace and sternum smooth, but with faint impressed pits in thoracic area; ♂ with slightly raised or flat cephalic area and without postocular sulci; ♀, sclerotised section of copulatory duct situated at lateral side of spermathecae 2

2. Male palpal tibia with dorsolateral apophysis clearly standing out above cymbium and longer than dorsomesal apophysis; embolus without triangular membrane at its extremity; ♀, sclerotised section of copulatory duct arched and situated at postero-lateral side of spermathecae; carapace width 0.67-1.14 mm . . . . . *T. peniculifer* Jocqué

– Male palpal tibia not standing out above cymbium and shorter than dorsomesal apophysis; embolus with triangular membrane at its extremity; ♀, sclerotised section of copulatory duct coiled and situated at antero-lateral side of spermathecae; carapace width 0.46-0.72 mm . . . . . *T. kruegeri* (Simon)

***Tybaertiella peniculifer* Jocqué, 1979** (Figs. 1-4, 7)

Tybaertiella peniculifer Jocqué, 1979: 752 (descr. ♂♀).

Locketia sp. 2: Holm, 1979: 277, figs. 113-116 (descr. ♂).

Locketia bicolor Locket & Russell-Smith, 1980: 62 (descr. ♂♀).

Tybaertiella peniculifer: Locket & Russell-Smith, 1981: 174.

Material examined

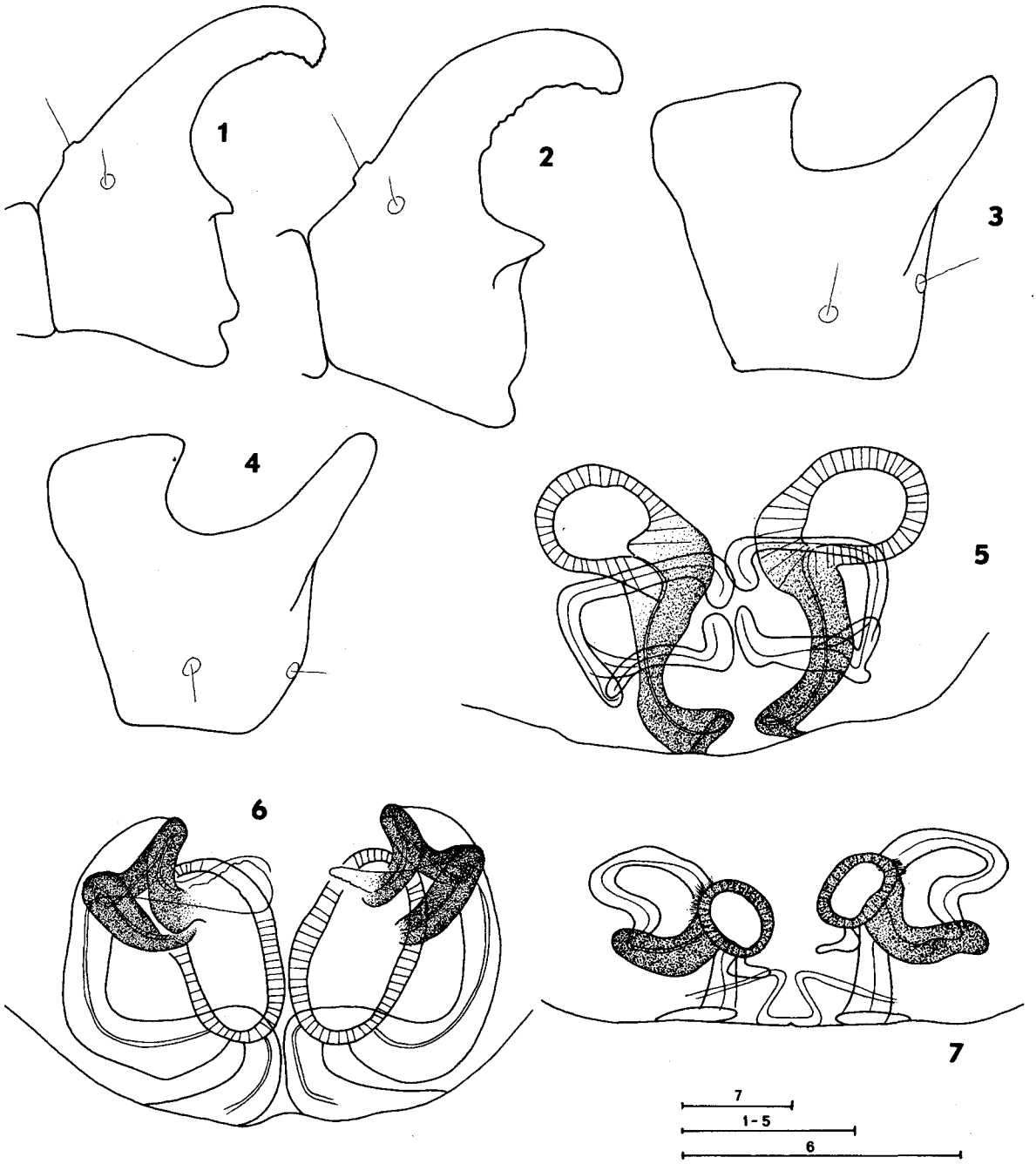
IVORY COAST: Kossou (150 m), between 10 May and 10 July 1975 (E. Tybaert), 17 ♂, 24 ♀ (MRAC).
NIGERIA: Ibadan, IITA, COPR plots, 16 March 1974 (A. Russell-Smith), 2 ♂, 2 ♀ (BMNH).
ETHIOPIA: Dembala Watcho, Siddamo (4°41'N, 38°19'E), Acacia savanna, 1600 m, 10 Oct. 1982 (A. Russell-Smith), 19 ♂, 30 ♀.

Diagnosis

The species may be recognised by the following combination of characters: a large species (carapace width, ♂ 0.67-0.84 mm, ♀ 0.83-1.14 mm) with smooth teguments but pitted thoracic area. Male carapace slightly raised; male palpal tibia with a narrow dorsolateral apophysis clearly standing out above cymbium and widely separated from lateral tooth (Figs. 1-2); dorsomesal apophysis broad and short; embolus without membranous triangular lobe. Epigyne with entrance openings clear. Vulva (Fig. 7) with copulatory ducts running to anterior part of epigyne where they turn towards lateral side continuing from there in a sclerotised duct which is arched and situated at postero-lateral side of spermathecae.

Variability

The species has been described several times by the authors mentioned above. Especially Holm's (1979) analysis of the male palp makes further description superfluous. Contours of male palpal tibiae from Ivory Coast and Ethiopia (Figs. 1-4) are given here for comparison. Specimens from Ivory Coast are very similar to those from Nigeria but differ slightly in somatic characters from an Ethiopian population. The latter are on average smaller (carapace width 0.69



Figs. 1-4: *Tybaertiella peniculifer* Jocqué, right male palpal tibia. **1-2** Lateral view; **3-4** Dorsal view. **1 & 4** Specimen from Ethiopia, Dembala Watcho; **2 & 3** Specimen from Ivory Coast, Kossou.

Figs. 5-7: Vulvae. **5** *T. convexa* (Holm); **6** *T. kruegeri* (Simon); **7** *T. peniculifer.*
Scales = 0.1 mm.

against 0.76 mm in males, 0.94 against 0.99 mm in females), the legs are shorter (length leg I/carapace width: 3.0 against 3.6 in males, 2.6 against 2.9 in females; tibia I is much less slender (TI l/w: 6.1 against 8.1 in males, 6.0 against 6.8 in females); the colour pattern is similar but much less contrasting and the male abdominal scutum tends to be smaller in Ethiopian specimens. The male palp and epigyne are very similar and in view of the variability which appears to be typical of this genus it was decided to consider these populations as possible extremes of the same species and not as separate subspecies.

Distribution

Ivory Coast, Nigeria, Ethiopia.

Biology

The species has so far been found up to 1600 m in low and sparse grassy vegetation or farmland where they spin tiny webs a few cm above ground level. They feed on collembola (*Xenylla* sp. (Hypogastruridae), det. P. Lawrence, BMNH) which swarm at the beginning of the rainy season. Adults have only been found in that period. It is important to note that spiders with prey have only been found running around and apparently catch their prey without the help of the web. In all cases this species was caught together with *T. kruegeri*. Although it was never seen ballooning, the species is likely to be a good aeronaut, large numbers having been caught at about 2 m from ground-level on maize plants at Ibadan together with numerous juveniles.

***Tybaertiella kruegeri* (Simon) comb. nov.** (Figs. 6, 8-29)

Araeoncus krugeri Simon, 1894: 652 (descr. ♂).

Lophocarenum bacelarae di Caporiacco, 1949: 372 (descr. ♂♀) **(syn.nov.)**.

Pelecopsis bacelarae: Denis, 1962: 170.

Araeoncus kruegeri: Denis, 1962: 171.

Pelecopsis bacelarae dundoensis Miller, 1970: 107 (descr. ♂) **(syn.nov.)**.

Pelecopsis (?) nonindurata Miller, 1970: 111 (descr. ♀ ♂) **(syn.nov.)**.

Pelecopsis bacelarae: Locket, 1974: 173 (descr. ♂).

Pelecopsis nonindurata: Bosmans, 1977: 458.

Tybaertiella minor Jocqué, 1979: 755 (descr. ♂ ♀) **(syn. nov.)**

Locketia sp. 1: Holm, 1979: 277 (descr. ♂).

Locketia minor Locket & Russell-Smith, 1980: 62 (descr. ♂♀).

Tybaertiella minor: Locket & Russell-Smith, 1981: 174.

Tybaertiella minor: Jocqué (in press).

Material examined

SOUTH AFRICA: Transvaal, Makapan, 2 ♂ (MNHN 17086), one is selected as lectotype by present designation. Warmbad, 17 Feb. 1977 (I. Vosloo), 1 ♀ (MRAC). Loskopdam, 2 Apr. 1973, grass, sweep-net (A. Dippenaar), 1 ♂ (MRAC).

MALAWI: Mt Mulanje, Lichenya Plateau, grassland, firebreak 2000 m, 17 Nov. 1981 (R. Jocqué), 22 ♂, 40 ♀ (MRAC).

KENYA: Mt Elgon, vid. Kaptega R., 1890 m, 16 Jan. 1979 (Å. Holm), 1 ♀ (UZM). Mt Elgon, Chepchoina River, 2050 m, 31 Jan. 1979 (Å. Holm), 1 ♂ (UZM). Nairobi (1500 m), June 1945 (Toschi & Meneghetti), 1 ♂, 4 ♀ (MCSN). Nairobi, Muthaiga Golf Course, 1600 m, 10 Aug. 1974 (J. Murphy), 1 ♀. Nairobi, 2000 m, 30 Aug. 1972 (J. Murphy), 1 ♀. Kitale, Kaibos, Keringet Dam, 2000 m, 23 Aug. 1974 (J. Murphy), 1 ♀. Kitale, Kaibos, 2000 m, 20-23 Aug. 1974 (J. Murphy), 5 ♂, 4 ♀. Kitale, Kaibos, 2000 m, 2-22 Aug. 1972 (J. Murphy), 4 ♂, 7 ♀. Kitale Forest, 1900 m, 4-18 Aug. 1972 (J. Murphy), 2 ♂, 2 ♀. Endebess, Robinson's Farm, 1700 m, 18 Aug. 1972 (J. Murphy), 1 ♂. Lake Naivasha, 1900 m, 3 Aug. 1974 (J. Murphy), 2 ♂, 9 ♀. Mt Kenya, Sirimon Track, 2850 m, 11 Aug. 1975 (R. Bosmans), 1 ♀ (MRAC). Mt Kenya, Naro Moru Track, 2000 m, 17 Aug. 1974 (J. Murphy), 2 ♂, 2 ♀.

UGANDA: Kigezi, Kisoto, March 1965 (J. E. D. Milner), 1 ♂ (BMNH). Busaga Distr., bords marais riv. Tavu, Feb. 1967 (Rwabunesa), 1 ♀ (MRAC).

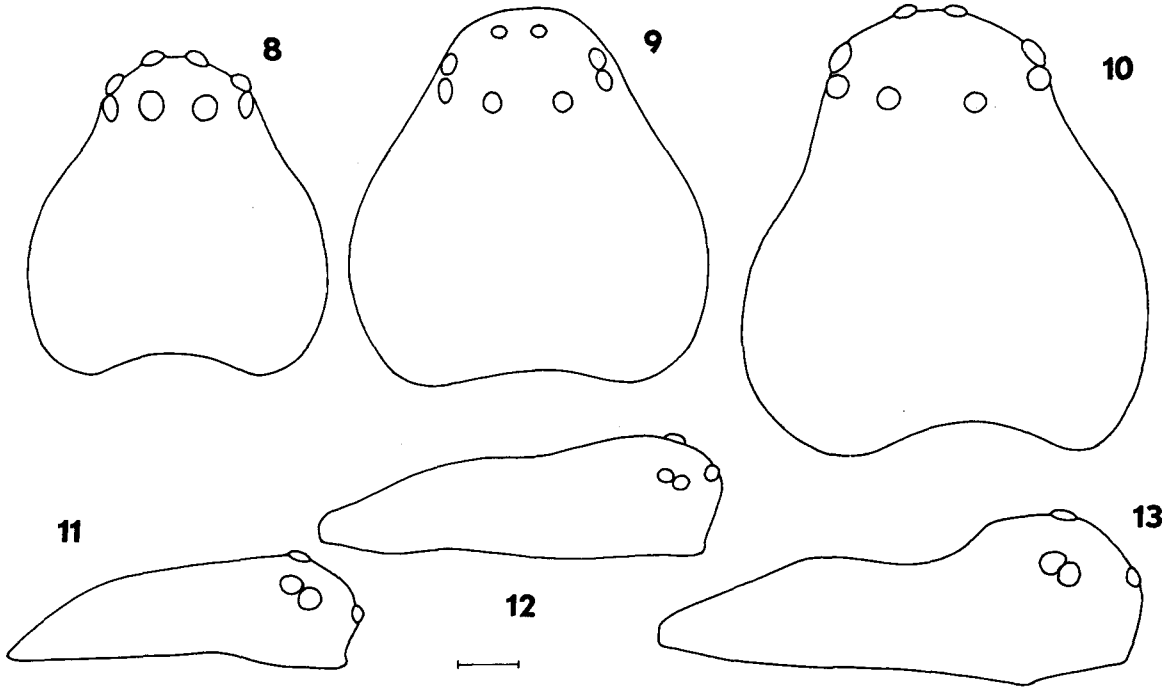
ZAIRE: Kivu: Kambaila, vallée de Kiharo, July 1973 (M. Lejeune), 1 ♀ (MRAC). Visiki, NW de Butembo, 1100 m, July 1974 (M. Lejeune), 1 ♂, 8 ♀ (MRAC). Ishango, Kasongwere Reserve, 2600 m, 1 April 1970 (M. Lejeune), 2 ♀ (MRAC). Butembo, vallée de la Musora, May 1967 (M. Lejeune), 2 ♀ (MRAC). Terr. Lubero, Forêt de Kasu, 1600 m, 27-31 Dec. 1966 (J. Célis), 2 ♀ (MRAC). Uvira, dans termitière, Nov. 1955 (N. Leleup), 1 ♀ (MRAC). Mt Lubwe, SE de Butembo, 2380 m, 13 April 1971 (M. Lejeune), 1 ♀ (MRAC). Mt Karisimbi, Rukumi, 3750 m, 16 July 1970, fauchage (M. Lejeune), 1 ♂ (MRAC).

ETHIOPIA: Dembala Watcho, 30 km S of Yavello,

Siddamo, 1600 m, Acacia savanna, 10 Oct. 1982 (A. Russell-Smith), 1 ♂ (MRAC). Adami, Abernossa Ranch, 1800 m, 17 June 1982, grass tussocks in Acacia woodland (A. Russell-Smith), 2 ♂, 4 ♀ (MRAC). Aposto, between Awassa and Dilla, 1700 m, short grass in forested valley, 1700 m, 29 Sept. 1982 (A. Russell-Smith), 2 ♂, 2 ♀ (MRAC). Lake Langano, Wabe Shabelle Resort, 1600 m, 24 Oct. 1982, heavily grazed grassland (A. Russell-Smith), 1 ♀ (MRAC).
NIGERIA: Ibadan, IITA, 9 Aug. 1980, shrubland (R. Jocqué), 1 ♀ (MRAC). Ibadan, IITA, COPR site, 29 Apr. 1974 (A. Russell-Smith), 4 ♂, 4 ♀ (BMNH).
IVORY COAST: Kossou, 5-18 May 1975, savanna (E. Tybaert), 5 ♂, 16 ♀ (MRAC).

Diagnosis

The species may be recognised by the following combination of characters. A small species (carapace width, ♂ 0.46-0.66 mm, ♀ 0.46-0.72 mm) with smooth teguments but faintly pitted thoracic area. Male carapace flat, or slightly raised in larger specimens; male palpal tibia with a fairly broad dorsolateral apophysis with distinctly toothed lateral margin; there is only a narrow space between it and the lateral tooth which also has a serrated margin. Dorsomesal apophysis of variable shape (Figs. 14-20, 28) but longer than dorsolateral one. Distal end of embolus with a triangular membranous lobe. Epigyne hardly chitinised, entrance openings difficult to see. Copulatory ducts run initially behind spermathecae, parallel and close to each other, then turn to lateral side and continue towards front of spermathecae where they become sclerotised and after having made a short loop, enter spermathecae at anterolateral side.



Figs. 8-13: *Tybaertiella kruegeri* (Simon). **8-10** Male carapace, dorsal view; **11-13** Ditto, lateral view. **8 & 11** Paratype of *T. minor* Jocqué, Ivory Coast, Kossou; **9 & 12** Unique male in type series of *Lophocarenum bacelarae* Caporiacco, Kenya, Nairobi; **10 & 13** Paralectotype of *T. kruegeri* (Simon), South Africa, Makapan.
Scale = 0.1 mm.

Variability

As mentioned above, the species has been described on several occasions. These descriptions (Simon, 1894; Caporiacco, 1949; Miller, 1970; Locket, 1974; Jocqué, 1979; Holm, 1979; Locket & Russell-Smith, 1980) already give a good idea of the variability of the species. Besides the size range which after all is not exceptional (Jocqué, 1981), it is mainly the variation of the eye pattern and the shape of the male palpal tibia that have caused confusion, explaining the numerous descriptions. It is possible that some of the variation in the shape of the male carapace is due to allometric growth: larger males tend to have a slightly higher carapace (Figs. 11-13). The phenomenon has been invoked for the variable length of chelicerae in other male spiders (e.g. Locket, 1932; Bosmans, 1982).

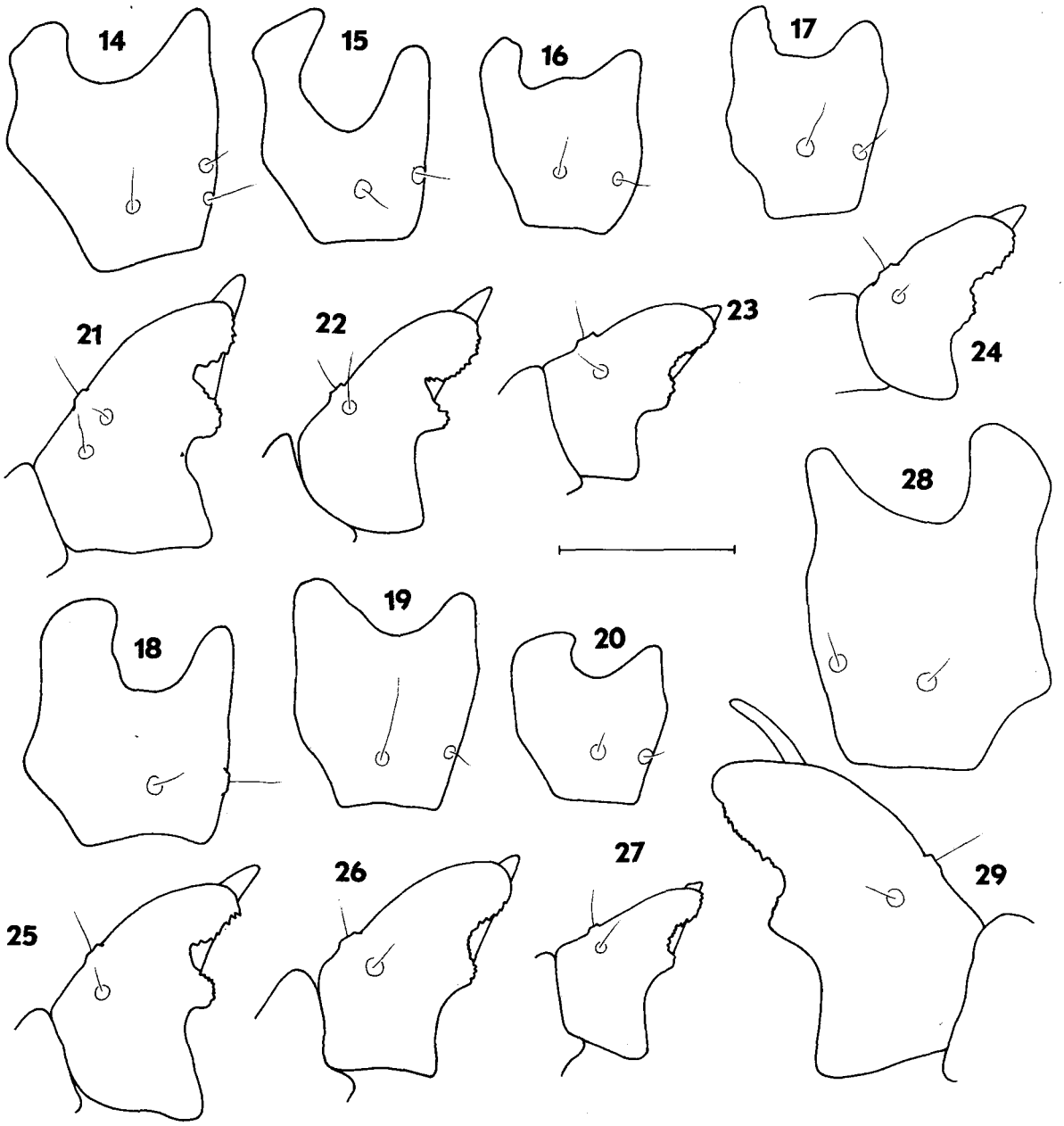
The total length of the legs shows a linear relationship to carapace width in both males and females. However, there is so much variation in the ratio of the leg segments amongst each other and in the ratio of length/width that, in this genus, these features must be considered as of little value for taxonomic purposes (Table 1).

The size of the eyes is very variable and in the same population the distance between the PME may vary between 0.5 and 1.1 times their diameter (e.g. females of *T. kruegeri* from Mt Mulanje, Malawi). The curvature of the posterior row of eyes varies accordingly; in males it is usually more procurved than in females. This may be the reason why Miller (1970) did not recognise *Pelecopsis (?) nonindurata* as the female of *Pelecopsis bacelarae dundoensis* from the same locality. Equally puzzling is the large variation in the shape of the dorsomesal apophysis of the male palpal tibia (Figs. 14-20, 28). Whereas the dorsolateral apophysis is of a fairly constant shape, the former may range from a simple rounded (Fig. 19) to an inward curved, roughly triangular lobe (Fig. 15). The depth of the indentation between the apophyses may accordingly vary to a large extent. Holm's (1979) analysis, however, has shown that in fact only the lateral side of the tibia and the apophysis on that side play a role in anchoring the bulb in a fixed position during copulation. As pointed out by Weiss (1982), the taxonomic value of characters of the male palp must be judged in the light of their function. As the dorsomesal apophysis does not seem to be directly functional in this respect, it is unacceptable that species and/or subspecies be created on the basis of the shape of this apophysis alone, especially since this character does not seem to be linked with other variable characteristics. As *Pelecopsis (?) nonindurata* Miller and *P. bacelarae dundoensis* Miller (the types are not available) obviously fall within the range of the mentioned variation they are here synonymised with *T. kruegeri* Simon.

From the studies of Millidge (1977) and Holm (1979) it is clear that *Tybaertiella* is a modern genus. This is shown by apomorphies such as the complete lack of tibial spines, no trichobothrium on Mt IV, only two trichobothria on the male palpal tibia (a male from Lake Naivasha has three!, Fig. 14) and the unusual palpal conformation which is obviously derived from that of *Pelecopsis.* All these features point to the fact that *Tybaertiella* is a recently

	PME apart (ϕ)	FeI/TiI	TiI l/d	Mt I/ta I	Mt III/ta III	Total length leg I	Carapace width
♂♂ Mean	1.3	1.20	5.5	1.15	1.31	1.54	0.53
Standard deviation	0.3	0.05	0.3	0.06	0.06	0.18	0.05
Range	0.6-1.7	1.12-1.34	4.8-6.1	1.05-1.24	1.20-1.43	1.41-2.19	0.46-0.66
n	17	16	16	16	17	17	17
♀♀ Mean	0.9	1.23	5.3	1.17	1.36	1.63	0.58
Standard deviation	0.3	0.05	0.5	0.06	0.10	0.17	0.07
Range	0.5-1.4	1.11-1.34	4.7-6.7	1.05-1.27	1.21-1.52	1.29-2.04	0.46-0.72
n	21	21	21	21	22	21	22

Table 1: Characters concerning eye position, legs and carapace in *Tybaertiella kruegeri* (Simon).



Figs. 14-29: *Tybaertiella kruegeri* (Simon). **14-20** Right male palpal tibia, dorsal view; **21-27** Ditto, lateral view; **28** Left male palpal tibia, dorsal view; **29** Ditto, lateral view. Specimens from: **14 & 21** Kenya, Lake Naivasha; **15 & 22** Ethiopia, Dembala Watcho; **16 & 23** Malawi, Mt Mulanje; **17 & 24** South Africa, Makapan, lectotype; **18 & 25** Ethiopia, Abernossa Ranch; **19 & 26** Zaire, Mt Karisimbi; **20 & 27** Ivory Coast, Kossou; **28 & 29** South Africa, Makapan, paralectotype.
Scale = 0.1 mm.

evolved genus. This would explain the large variation between and within the populations which may eventually evolve to separate subspecies or even species unless this is prevented by continuous exchange of genes as a consequence of the aeronautic behaviour of the species.

Distribution

South Africa (Natal, Transvaal), Malawi, Kenya, Uganda, Zaire (Kivu), Angola, Ethiopia, Nigeria, Ivory Coast.

Biology

As the preceding species, *T. kruegeri* is found in short grassy vegetation and on arable land from near sea level up to 3750 m. In most cases it is found on savannas with densely wooded areas in the neighbourhood. This may be connected with the mode of "hibernation" of the species which passes the dry season under loose tree-bark. More than a hundred subadult specimens were found in January at Kossou (Ivory Coast) under the bark of a single large tree (unpublished data). Although *T. kruegeri* apparently preys on collembola it is not dependent on collembola swarms as *T. peniculifer* seems to be. On Mt Mulanje (Malawi) a dense population was observed during several days. The animals lived on a broad footpath along a firebreak and were found there in very short (± 20 cm) sparse grass vegetation. Early in the morning they could easily be seen in their dew-covered webs, males and females often on the same web. As the sun rose and the dew dried up, they tended to leave their webs and were often seen running on the ground. In the afternoon none could be found and it is supposed that they were hiding in denser vegetation nearby. After sunset they could be found again running around or hanging in their tiny webs. Heimer & Nentwig (1982) have suggested that erigonine Linyphiidae do not spin webs to catch prey but simply to keep the microclimate within acceptable limits. Although it is unlikely that this hypothesis holds for all representatives of this group of spiders, the above-mentioned observations may confirm that it is true for at least some of them. The feeding behaviour of *T. peniculifer* (see above) points in the same direction.

As this observation shows that the animals are not reluctant to leave their webs, it may also explain how both *Tybaertiella* species could survive in the regularly flooded erosion gullies in which they were found in Ivory Coast (Jocqué, 1979).

If the web is important for the maintenance of relative humidity and if copulation occurs there, as observations appear to show, males may find themselves in dangerously dry conditions when wandering around in search of a female. It therefore seems acceptable that the development of a dorsal abdominal scutum in males only, is an answer to the hazard of running around among sparse sunlit vegetation.

The species appears to be a common aeronaut. It is often caught by sweeping vegetation and was collected on several occasions when ballooning.

Egg cocoons were found hung up in the sharp corner made by folded grass leaves. They contain 10 eggs (9-11) on average. The eggs are bright pinkish orange.

***Tybaertiella convexa* (Holm) comb.nov.** (Fig. 5)

Cnephalocotes convexus Holm, 1962: 123 (descr. ♀).

Cnephalocotes compar Holm, 1962: 124 (descr. ♀).

Cnephalocotes convexus: Holm, 1968: 8.

Pelecopsis machadoi Miller, 1970: 102 (descr. ♂ ♀) **(syn. nov.)**.

Pelecopsis machadoi: Thaler, 1974: 266.

Locketia convexa: Holm, 1979: 275 (descr. ♂).

Locketia machadoi: Holm, 1979: 275.

Locketia convexa: Locket & Russell-Smith, 1980: 64.

Material examined

KENYA: Mt Kenya, Naro Moru Track, 2000 m, 17 Aug. 1974 (J. Murphy), 1 ♀. Kitale Forest, 1900 m, 18 Aug. 1972 (J. Murphy), 20 ♂, 1 ♀. Kitale, Kaibos Farm, 2000 m, 30 July-15 Aug. 1972 (J. Murphy), 4 ♂, 3 ♀. Kitale, Kaibos Farm, 2000 m, 20 July 1974 (J. Murphy), 1 ♂, 2 ♀. Kitale, Copper Dam, 1900 m, 16 Aug. 1972 (J. Murphy), 7 ♀. Lake Naivasha, 1900 m, 3 Aug. 1974 (J. Murphy), 1 ♂, 8 ♀. Nairobi, 1600 m, 20 Aug.-10 Sep. 1965 (V. Mahnert), 2 ♂ (coll. Thaler).

ZAIRE: Kivu, Visiki, NW de Butembo, 1100 m, June 1974 (M. Lejeune), 1 ♀ (MRAC). Camp de Makayeba, Semliki, 12 July 1968 (M. Lejeune), 2 ♀ (MRAC). Vallée de Kaisola, Plaine de la Ruindi, 1100 m, 3 July 1972 (M. Lejeune), 2 ♀ (MRAC). Terr. Lubero,

forêt de Kasuo, 1600 m, 27-31 Dec. 1966 (J. Célis), 1 ♀ (MRAC). Kambaila, vallée de Kiharo, June 1973 (M. Lejeune), 1 ♀ (MRAC). Mbao, route Beni-Irumu-Bunia, 1100 m, 26 Dec. 1975 (M. Lejeune), 2 ♂, 4 ♀ (MRAC).
IVORY COAST: Bouaflé, Koudougou, forêt secondaire, 22 Jan. 1981 (J. Everts), 2 ♀.

Diagnosis

A medium sized species (average carapace width, ♂ 0.63 mm, ♀ 0.69 mm) with finely reticulated teguments. Cephalic area of male raised, reaching its highest point at PME; with postocular sulci. Male palpal tibia with a roughly rectangular, broad dorsal apophysis, truncate and slightly indented at the extremity, and a narrow lateral apophysis which may be rounded or truncate at the tip. Embolus broad and ribbon-like to distal end. Vulva with pear-shaped spermathecae; distal sclerotised part of copulatory ducts straight and situated behind spermathecae (Fig. 5).

Variability

The variability of *T. convexa* is much less extreme than in the preceding species. The size range is narrow and the size and position of the eyes fairly constant. There is slight variation in the shape of the carapace in females (Holm, 1962, figs. 42 and 43) as well as in males (Holm, 1979, fig. 107; Miller, 1970, fig. XIII, 1). The difference in shape of the distal end of the lateral palpal apophysis is mainly a question of orientation, although some slight variation does exist. Some males may have a rounded apophysis whereas in others from the same population it is more or less truncate (e.g. males from Kitale Forest, Kenya). Although I have not seen the types of *Pelecopsis machadoi* Miller from Angola, I am virtually certain that they belong to the same taxon as the one described by Holm (1962, 1979).

Distribution

Uganda, Kenya, Angola, Zaire (Kivu Prov.), Nigeria, Ivory Coast.

Biology

T. convexa lives in a different habitat from that inhabited by the other *Tybaertiella* species. It is always found in leaf-litter under more or less dense woody vegetation. Secondary forest or other man-made wooded habitats appear to be preferred. Nothing is known about the feeding behaviour of this species. Although its wide distribution should make one assume that *T. convexa* is a good aeronaut, there are no data to support the hypothesis.

Genus *Pelecopsis* Simon, 1864

***Pelecopsis tybaertielloides* n. sp.** (Figs. 30-36)

Among the numerous specimens of *T. kruegeri* collected by J. Murphy in Kenya we found a male which appeared to belong in the genus *Pelecopsis*. However, the habitus and somatic characters are strikingly similar to those of *T. kruegeri* and it will therefore be called *Pelecopsis tybaertielloides* n. sp.

Type material

Holotype male, Kenya, Kitale, Saiwa Swamp, 1800 m, 10 Aug. 1972, J. Murphy, (MRAC 160 076).

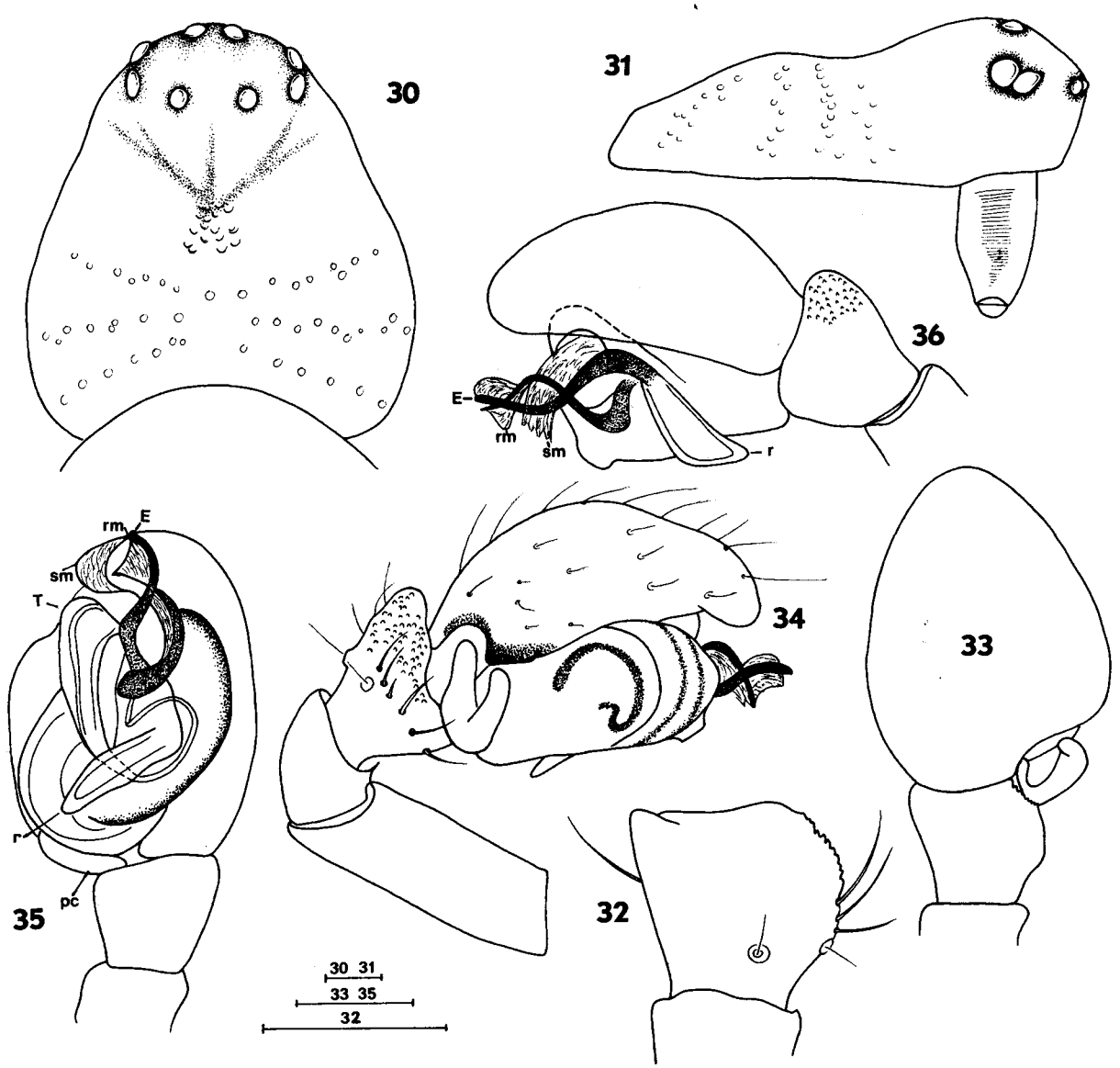
Description

Total length 1.81 mm, carapace 0.72 mm wide, 0.85 mm long, ocular area 0.32 mm wide. Colour: carapace orange-brown, slightly darker in cephalic area with three dark streaks radiating from fovea towards posterior eyes; sternum orange, darkened along margin; chelicerae pale brown; legs: tibiae and femora darker than tarsi and metatarsi which are pale brown; abdomen dark grey with orange-brown dorsal and ventral scuta. Carapace (Figs. 30-31): broad, slightly raised in cephalic area; tegument smooth but with impressed pits on striae and a roughened area in front of fovea. Eyes small; posterior row procurved, anterior row straight; AME 0.8 times their diameter apart and twice their diameter from ALE which are slightly larger. PME as large as ALE, twice their diameter apart and at one diameter from PLE which are 1.5 times as large. Clypeus straight but retreating, its height 2.5 times the diameter of an ALE. Sternum as long as broad: 0.48 mm. Posterior coxae separated by their length. Chelicerae short (0.32 mm), lateral sides concave, provided with a long stridulating file consisting of short ridges. Anterior margin with three teeth,

posterior margin not examined. Legs: measurements (mm):

	Fe	Pa	Ti	Mt	ta	Total
I	0.59	0.19	0.56	0.50	0.38	2.22
II	0.64	0.20	0.51	0.47	0.37	2.19
III	0.54	0.19	0.41	0.42	0.31	1.87
IV	0.74	0.21	0.66	0.53	0.34	2.48

Tibiae and patellae without spines. Tm I: 0.36, Tm II and Tm III: 0.38. Abdomen with dorsal and ventral scutum each covered with numerous short hairs, leaving only a narrow lateral and frontal strip of tegument uncovered. The small frontal area just above the petiolus is provided with some short hairs



Figs. 30-36: *Pelecopsis tybaertielloides* n. sp. **30** Male carapace, dorsal view; **31** Ditto, lateral view; **32** Male palpal tibia, dorsal view; **33** Male palp, dorsal view; **34** Ditto, lateral view; **35** Ditto, ventral view; **36** Ditto, mesal view. (E = embolus, pc = paracymbium, r = radical part, rm = radical membrane, sm = suprategular membrane, T = tegulum). Scales = 0.1 mm.

and four brown impressed dots. Palpus (Figs. 32-36): tibia short, approximately as long as high; anterior dorsal side almost straight, without true apophysis but roughened by numerous small warts; a lateral row of long hairs; 2 trichobothria; cymbium broad with a strong sclerotised postero-lateral margin; paracymbium simple; subtegulum large; tegulum with a very poorly developed protegulum without papillae; embolus long and more or less corkscrew-shaped, accompanied by a long embolar apophysis with a more or less sclerotised membrane (rm), connected to the suprategular membrane (sm). Radical part pointing in postero-lateral direction. Female unknown.

Diagnosis

The species is easily recognised by its habitus, the male palpal tibia without apophysis and the characters of the bulbus.

Discussion

P. tybaertielloides has several characters in common with *T. kruegeri*: no tibial or patellar spines, slightly raised male carapace, absence of postocular sulci, impressed pits on radiating striae, ventral sclerotisation of the abdomen, 2 trichobothria on male palpal tibia, Tm I near 0.40. However, the species is placed in the genus *Pelecopsis* in view of the palpal conformation. In *Tybaertiella* the radical part points in an antero-lateral direction or even straight forwards and the protegulum is well developed and bears terminal papillae; in *P. tybaertielloides* the radical part is directed postero-laterally and the protegulum is hardly developed. The type of embolic division is shared with two other *Pelecopsis* species, *P. tenuipalpis* Holm and *P. nigriceps* Holm, but as shown in Table 2 there are important differences from both these species. Another typical feature of the species is the absence of a tibial apophysis on the male palp. The species thus obviously belongs in a separate group, different from those recognised by Holm (1979) and appears to be intermediate between *Pelecopsis* and *Tybaertiella*.

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	Male carapace	Postocular sulci	Tibial spines	Tm I	Palpal trichobothria	Direction of radical part	Dorsal tibial apophysis
Pelecopsis							
tenuipalpis	markedly raised	+	1111	0.50	1	postero-lateral	long
nigriceps	raised	–	0000	0.52	1	postero-lateral	long
nemoralis	markedly raised	+	0000	0.52	1	backward	long
tybaertielloides	slightly raised	–	0000	0.36	2	postero-lateral	absent
Tybaertiella							
kruegeri	slightly raised	–	0000	0.40	2	antero-lateral	short

Table 2: Characters concerning male carapace, male palp and chaetotaxy of some species in the genera *Pelecopsis* and *Tybaertiella*.

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