

Six new species of *Neotrepbes* China, 1936 (Heteroptera: Helotrephidae) from Brazil, with a key to Neotropical Helotrephidae

Nico Nieser¹ and Pingping Chen²

¹ Htg. Eduardstr. 16, 4001 RG Tiel, The Netherlands. E-mail:bugs.01@freeler.nl

² National Natural History Museum Naturalis, P.O. Box 9517, Leiden, The Netherlands.

Abstract. - Six new species of *Neotrepbes*: *N. fragosus* sp. n., *N. lanemelo* sp. n., *N. latus* sp. n., *N. minutus* sp. n., *N. transversus* sp. n. and *N. variegatus* sp. n. are described from the Brazilian state of Minas Gerais. A key to the species of American Helotrephidae is added.

Key words: Heteroptera, Helotrephidae, *Neotrepbes*, New species, Brazil, Key.

Introduction

Species of Helotrephidae are small Nepomorpha at present considered to be most closely related to the Pleidae (Mahner 1993), with which they form a superfamily Pleoidea. Members of this family can be immediately recognized by the fact that the head and pronotum are fused.

Neotrepbes is one of the two genera of Helotrephidae occurring in the Americas (China, 1940; Nieser, 1975). The other genus *Paratrepbes* China contains only one species, *P. hintoni* China, restricted to the Guyanas. Nieser & Lane de Melo (1977) made a general remark on the habitat of *Neotrepbes* but the actual microhabitat of *Neotrepbes* was unknown. During a recent collecting trip in Minas Gerais, when most of the specimens treated in this paper were collected, it was discovered that most specimens are to be found at the edge of virtually stagnant parts of streams and rivers usually between emergent or overhanging plants or in rock pools. They are, at least in Minas Gerais, not so rare as the previous collecting results suggest.

Up to now three species have been described all from south and southeastern Brazil (SC, RJ, China 1936, 1940). In this paper six new species are added all from the state of Minas Gerais. In addition a few distributional records of the known species have been added.

Material and methods

Although in Helotrephidae the head and pronotum are fused to form a cephalonotum, in the genus *Neotrepbes* there is a distinct groove behind the eyes separating head and pronotum, which are easily recognizable. Therefore in the descriptions reference will be made to head and pronotum.

Measurements are in mm and if available, based on five males and five female paratypes of each sex from the series containing the holotype. They are presented by the mean, in case of body measurements followed by "s" the standard deviation

based on the sample. Measurements of rostral and leg segments are given as the mean value only. If only two specimens are available, body measurements are presented as the range. Length without specification refers to the body length.

The main structural characteristics for specific identification are to be found in the parameres and aedeagus of the male, and the seventh abdominal sternite of the female. A peculiarity in this family is that the genital capsule of the male is rotated 90°. So instead of two lateral parameres there is a dorsal and a ventral paramere. Consequently the dorsal paramere is figured in dorsal view and the ventral paramere in ventral view. The aedeagus has an expansion on its inner side of a thinner structure than the main body of the aedeagus. The outline of this expansion is irregularly crenulate as shown in Fig. 19. In other figures of the aedeagus the crenulation is not represented. Other structural characteristics such as seventh and eighth abdominal sternite of the male or the ventral carina on thorax and abdomen are of little diagnostic value at the species level.

A roman numeral indicates either a month or a larval instar e.g. IvIV means fourth instar larva(e).

Abbreviations.

BMNH = British Museum of Natural History, London, UK.

brach. = brachypterous.

DPIC = Department of Parasitology, Institute of Biological Sciences, Federal University of Minas Gerais in Belo Horizonte, MG, Brazil.

lv = larva(e).

macr. = macropterous.

MG = Minas Gerais.

NCTN = Nieser Collection, Tiel, The Netherlands.

PCUB = A. Pelli collection, Uberaba, MG, Brazil.

RJ = Rio de Janeiro.

RMNH = National Natural History Museum at Leiden, The Netherlands.

SC = Santa Catarina.

SP = São Paulo.

ZMAN = Entomological Collection of the Zoological Museum of the University of Amsterdam, The Netherlands.

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Key to Neotropical Helotrephidae

1. Rostrum long, extending to the middle of the hind coxae, fourth segment nearly four times as long as third; cephalonotal suture in brachypterous form virtually straight behind eyes *Paratrephes* China, 1940
Only one species occurring in the Guyana's known:
P. hintoni China, 1940.
- Rostrum short, not reaching the middle coxae, third and fourth segment of subequal length; cephalonotal suture in brachypterous form distinctly curved backwards behind eyes (Fig. 1) *Neotrephes* China 2
2. Length over 2.2 mm 3
- Length 2.2 mm or less, or if just over 2.2 mm then narrow part of ventral paramere long, and female with a distinct costal sensory lobe 5
3. A broad species, ratio length/width 1.25; dorsal paramere straight, long and slender (Fig. 13) *N. latus* sp.n.
- Ratio length/width 1.5; dorsal paramere either short and stout (Fig. 31) or distinctly curved (Fig. 29) 4
4. Length 2.3-2.5 mm, male ventral paramere with narrow apical part long (Fig. 32); female with a distinct costal sensory lobe. *N. usingeri* China
- Length 2.2-2.4 mm, male ventral paramere with narrow apical part short (Fig. 28); female without a costal sensory lobe *N. jaczewskii* China
5. Small species, length 1.6-1.7 mm 6
- Medium sized species length 1.8-2.2 mm 7
6. Male ventral paramere without a narrow apical part (Fig. 17); female seventh abdominal sternite with a long and narrow median caudal process which is very slightly incised caudally (Fig. 12) *N. minutus* sp. n.
- Male ventral paramere with an elongate narrow apical part (Fig. 21); female seventh abdominal sternite with a shorter, apically rounded median caudal process (Fig. 22) *N. transversus* sp. n.
7. Length 2.0 mm or more; male dorsal paramere with a tapering apex (Fig. 24); female without a costal sensory lobe (Fig. 3) ..
..... *N. variegatus* sp. n.
- Length less than 2.0 mm or if slightly more than male dorsal paramere with a truncate or slightly expanded apex and female with a costal sensory lobe (Fig. 3) 8
8. Pronotum posteriorly with a transverse ferruginous band which does not extend anteriorly in its median part; dorsal paramere with an expanded tip (Fig. 29) *N. plaumanni* China
- Transverse yellow to ferruginous band posteriorly on pronotum medially extending anteriorly to the cephalonotal suture 9
9. Dorsal paramere not strongly curved (Fig. 4); basal part of female seventh abdominal sternite strongly swollen, in lateral view visible as a distinct ventral lump *N. fragosus* sp. n.
- Dorsal paramere strongly curved (Fig. 8); basal part of female seventh abdominal sternite not swollen, in lateral view not or hardly visible *N. lanemelo* sp. n.

Neotrephes China, 1936

Diagnosis (Fig. 1). In lateral view the dorsal outline from eyes to apex of scutellum almost flat. Dorsal surface punctate,

punctures fine between eyes becoming progressively coarser posteriorly. Dorsum sparsely beset with white bristles. Suture between head and pronotum present, head distinctly extending behind eyes in the middle especially in the brachypterous form; antennae one-segmented in brachypterous form, two-segmented in macropterous form; rostrum short, at most reaching the middle of the mesosternal carina. Lateral margins of pronotum sinuate. Hemelytra of brachypterous form without claval suture, clavulus demarcated by a suture and ending in a small tubercle, which in dorsal view is visible as a small lateral projection; posteriorly of clavulus with a longitudinal lateral ridge near costal margin. Basal width of scutellum 1.5 times or more its median length. Tarsal formula (adults) 3-3-3, first segment short, second and third segments of subequal length. All species of *Neotrephes* are predominantly brachypterous with hemelytra slightly and the hind wings strongly reduced. Macropterous specimens (Fig. 2) are apparently rare.

So far the genus has only been found in the South and Southeast of Brazil.

Neotrephes fragosus sp. n.

(Figs. 4-7)

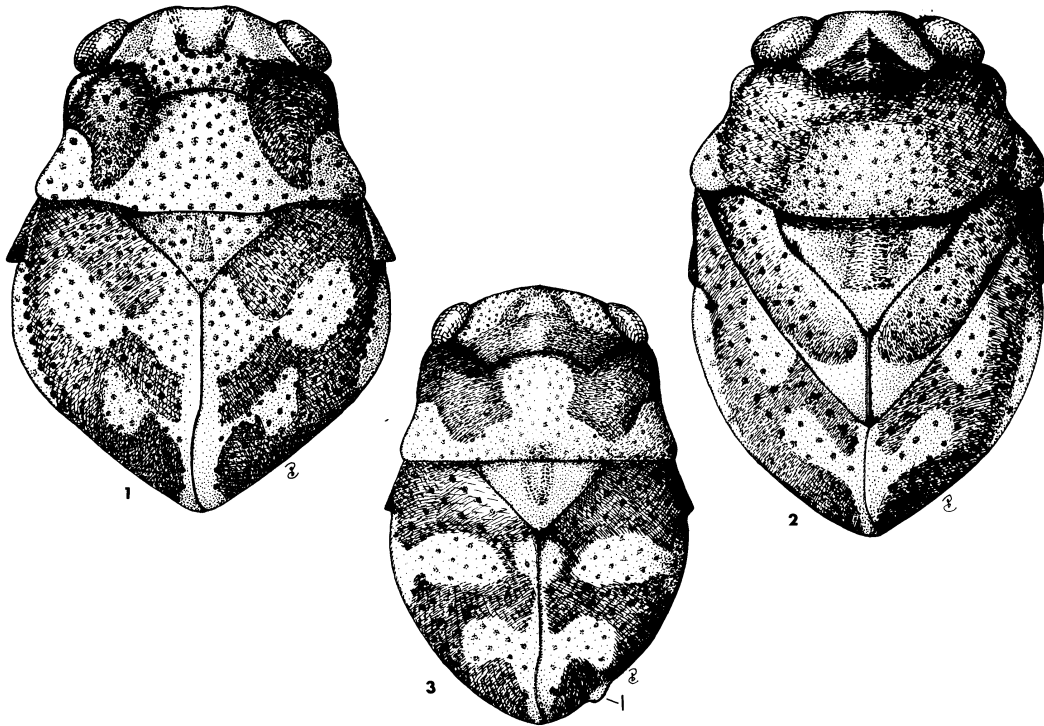
Type material.- Holotype brachypterous female (DPIC), Brazil: MG, São Roque de Minas, Serra da Canastra, Rio São Francisco at park station «base da cachoeira Casca d'Anta», 6.XI.1997 leg. N. Nieser (N9722). River in gallery forest, about 20-30m wide with small islands (which at rain are under water) gravel, stones, boulders, depth variable up to over 1m. Water clear, light brown. *Neotrephes* collected at edge between overhanging vegetation. Paratypes (adults only), same data as holotype 10♂ 35♀, 14 lvV. (NCTN, 1♂ 1♀ each in DPIC, RMNH, ZMAN). São Roque de Minas, Serra da Canastra, Cachoeira do Rolino, 8.XI.1997, leg. N. Nieser (N9725). On top various pools formed by stones, rock and strips of vegetation on sand. *Neotrephes* from mosses at edge of a deep pool, water very light brown, clear, virtually no current, 1♂ 2♀ (NCTN). All brachypterous.

Description, brachypterous specimens. - Generally a medium sized, dark species. Dimensions. Length ♂ 1.96, s = 0.052, ♀ 1.99, s = 0.030; width ♂ 1.38, s = 0.045, ♀ 1.42, s = 0.041; anterior width between eyes ♂ 0.53, s = 0.029, ♀ 0.56, s = 0.041.

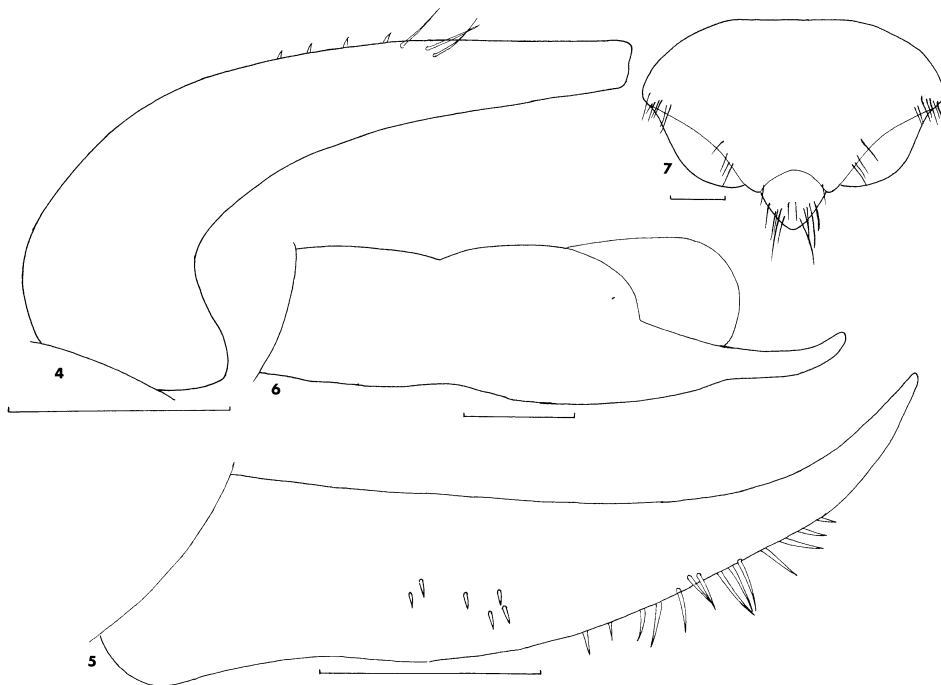
Colour. - Head dark yellow except for the median part behind eyes which is blackish; eyes black, shining. Pronotum anterolaterally blackish, median part ferruginous except for a narrow line at anterior margin, posterior transverse band ferruginous, humeral angles yellowish. Scutellum largely ferruginous with a small central dark spot. Hemelytra dark, with a roundish ferruginous spot medially, immediately behind scutellum, narrowly connected with another ferruginous transverse mark in posterior third of hemelytra and with an extension along midline to the tip of hemelytra; in addition, laterally of the roundish spot behind scutellum a roundish spot in the middle of each hemelytron and a ferruginous stripe along lateral margin just behind the tubercle of the clavulus. Venter dark brown, head yellowish, lateral parts of prosternum and basal part of abdominal sternum light brown; legs yellowish.

Structural characteristics. - General shape oval, with its greatest width about midway the scutellum across the tubercles

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Figs. 1-3 - Habitus of *Neotrephes* species.- 1, *N. variegatus* sp.n., paratype brachypterous female, body length 2.11 mm; 2, *N. variegatus* sp. n. paratype macropterous female, body length 2.13 mm; 3, *N. lanemeloi* sp. n., paratype brachypterous female, 1 = sensory lobe.



Figs. 4-7 - *Neotrephes fragosus* sp. n. paratypes. - 4, dorsal paramere; 5, ventral paramere; 6, aedeagus, ventral view; 7, seventh abdominal sternite of female. All scales = 0.1 mm

of the clavuli. Rostrum reaching the posterior margin of the prosternal keel, length of rostral segments 0.10:0.06:0.21:0.22. Humeral width of pronotum two and a half times its median length (1.25/0.50). Scutellum over 1.5 times as wide at base as its median length (0.5/0.3). Hemelytra with well defined regular pits, claval suture absent, clavulus demarcated by a suture. Ridge behind cavulus narrow. Measurements of leg segments in table 1.

Male. Dorsal paramere with a truncate apex (Fig. 4), ventral paramere long (Fig. 5), aedeagus with apical extension elongate and narrow (Fig. 6).

Female. Right hemelytron with a sensory lobe laterally near apex (as in Fig. 3). Seventh abdominal sternite swollen at base, showing a distinct ventral lump in lateral view, median caudal process relatively short, rounded caudally (Fig. 7).

Etymology. - *Fragosus* (Latin adjective: bumpy) refers to the swollen basal part of seventh abdominal sternite in the female and the ventral carina which is somewhat higher than in other species.

Comparative notes. - Females are easily recognizable by the strongly swollen basal part of sternite seven which in lateral view is visible as a ventral lump. The male ventral paramere is similar to that of *N. plaumanni*. However, *N. plaumanni* has the dorsal paramere somewhat expanded at the apex and the apical process of the aedeagus slightly shorter. Moreover, the transverse ferruginous band posteriorly on pronotum does not extend anteriorly in *N. plaumanni*. The colour pattern of *N. fragosus* is virtually identical with that of *N. variegatus* and *N. lanemelo*. *N. variegatus* is larger on average, *N. lanemelo* slightly smaller. Both lack the bump on seventh sternite in females and have different dorsal parameres (Figs. 4, 8, 24).

***Neotrepes lanemelo* sp. n.**

(Figs. 3, 8-11)

Neotrepes jaczewskii; Nieser & Lane de Melo 1997: 73 (partim, specimens from Perdizes and São Roque, misidentification).

Type material. - Holotype: Brachypterous male (DPIC), BRAZIL, Minas Gerais, Perdizes, Corrêgo at Recanto do Sr. Jesus, 20.III.1996 (19°22'57"S/47°12'29"W, N9629), leg. N. Nieser & A. Pelli. Shaded stream in meadows, with some patches of sunshine, water hyaline, clear, bottom sand and pebbles. *Neotrepes* at edges between plant debris. Paratypes (adults only): Same data as holotype, 9♂ 7♀ (NCTN, 1♂ 1♀ each in RMNH, ZMAN, BMNH). Minas Gerais, Rio do Peixe ± 5 km upstream of S. Roque, at camping site, 7.XI.1997, leg. N. Nieser & A. Pelli. River bed very broad (probably artificially as result of search for minerals (diamonds). The (probably) original bed mostly shaded with well developed marginal vegetation, secondary gully mostly exposed to sun, bare margins except for shrubs and trees, bottom pebbles, 8♂ 14♀, 111vIV/V. All brachypterous.

Description. brachypterous specimens. - Generally a medium sized, dark species. Dimensions. Length ♂ 1.89, $s = 0.020$, ♀ 1.94, $s = 0.031$; width ♂ 1.31, $s = 0.008$, ♀ 1.36, $s = 0.045$; width between eyes anteriorly ♂ 0.51, $s = 0.025$, ♀ 0.52, $s = 0.034$.

Colour. - Head between eyes, in dorsal view orange with a median triangular blackish spot, in frontal and ventral view

orange, part of head behind eyes black, eyes dark castaneous to blackish grey. Pronotum and hemelytra dull black with ferruginous markings as follows (Fig. 3): pronotal part of cephalonotum dark with a large median ferruginous spot starting near anterior margin, there about one third the width of pronotum, posteriorly widening abruptly to cover the entire posterior margin, in addition a pair of lateral spots in posterior half; scutellum largely ferruginous with a small central dark spot, hemelytra dark with a roundish ferruginous spot medially, immediately behind scutellum narrowly connected with another ferruginous transverse mark in posterior third of hemelytra, with an extension along midline to the tip of hemelytra; in addition, laterally of the roundish spot behind scutellum a roundish spot in the middle of each hemelytron and a ferruginous stripe along lateral margin just behind the tubercle of the clavulus. Specimens tend to be covered by a layer of silt totally obscuring the lighter marks. Venter dull black, legs yellowish.

Structural characteristics. - General shape oval, with its greatest width about midway the scutellum across the tubercles of the clavuli. Rostrum reaching to or very slightly beyond the posterior margin of the prosternal keel, length of rostral segments 0.05:0.03: 0.125:0.14. Humeral width of pronotum three times its median length (1.20/0.43). Scutellum over 1.5 times as wide at base as its median length (0.5/0.3). Hemelytra with well defined regular pits, claval suture absent, clavulus demarcated by a suture. Measurements of leg segments in table 1.

Male. Dorsal paramere strongly curved with a tapering apex (Fig. 8), ventral paramere with elongate apical part (Fig.10), aedeagus with apical part relatively broad (Fig. 9).

Female. Right hemelytron with a sensory lobe laterally near apex (Fig. 3). Seventh abdominal sternite with a broad median caudal process which is very slightly incised caudally (Fig. 11).

Etymology. - Dedicated to Professor A. Lane de Melo for his interest in and stimulation of the study of the water bugs of Minas Gerais.

Comparative notes.- Colour pattern virtually identical with that of *N. fragosus* and *N. variegatus*, see under *N. fragosus*.

***Neotrepes latus* sp. n.**

(Figs. 13-15)

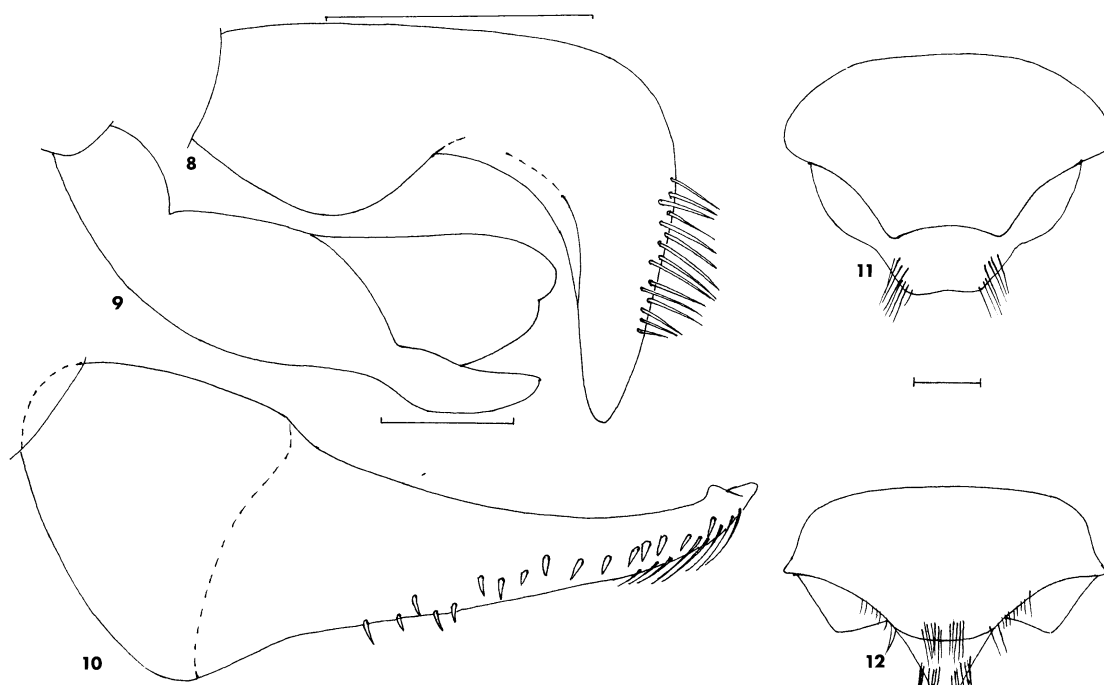
Neotrepes jaczewskii Nieser & Lane de Melo, 1977: 73 (partim, the specimen from Nova Lima, misidentification)

Type material.- Holotype brachypterous male (DPIC), BRAZIL: MG, Nova Lima, São Sebastião de Águas Claras, Ribeirão Marumbé, 1.III.1994. Under overhanging bank of stream, leg. N. Nieser (N9215c).

Description. brachypterous specimen. - Generally a large, relatively broad, spotted species. Dimensions. Length ♂ 2.26, width ♂ 1.85; width between eyes anteriorly ♂ 0.60.

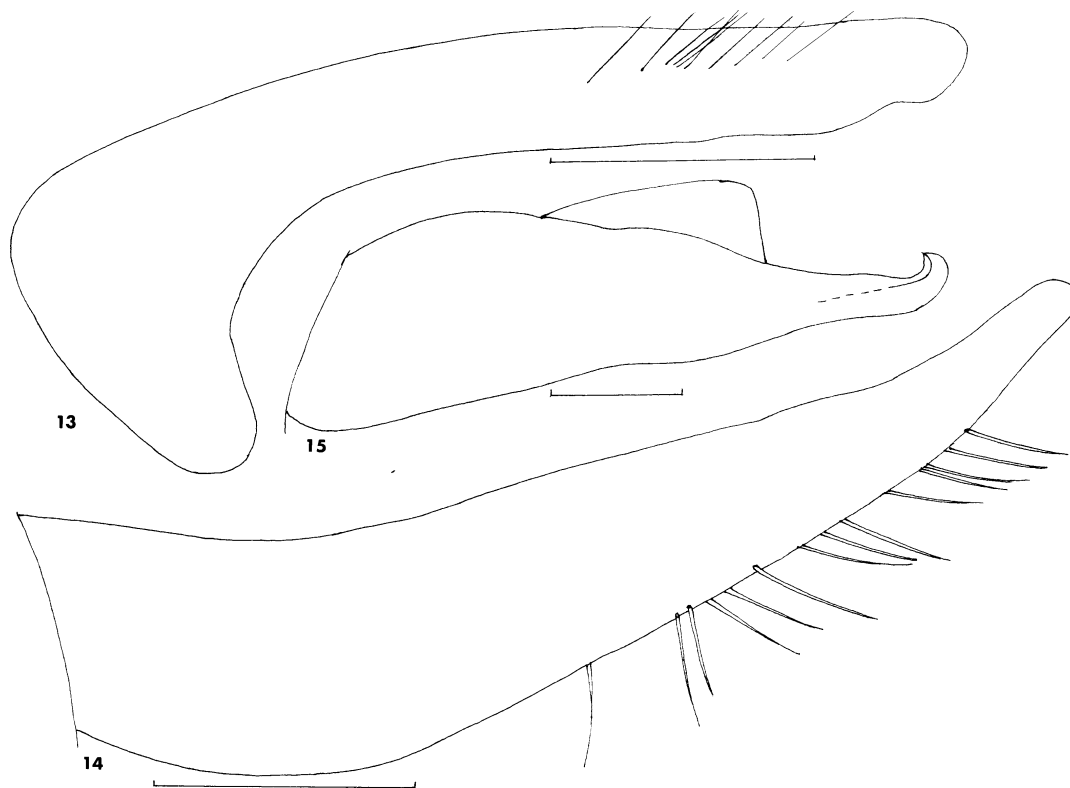
Colour. - Part of head between eyes in dorsal, frontal and ventral view yellow, part of head behind eyes black; eyes dark castaneous to blackish grey. Pronotum and hemelytra dull black with yellowish markings as follows: pronotal part of cephalonotum dark with a large median yellowish spot starting near anterior margin, there about one third the width of pronotum, posteriorly widening to cover the median half of posterior margin, in addition posterolateral angles of pronotum; scutellum

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Figs. 8-11 - *Neotrephes lanemeloii* sp. n. paratypes. - 8, dorsal paramere; 9, aedeagus, ventral view; 10, ventral paramere; 11, seventh abdominal sternite of female. All scales = 0.1 mm

Figura 12 - *Neotrephes minutus* sp. n. paratype female, seventh abdominal sternite.



Figs. 13-15 - *Neotrephes latus* sp. n. holotype male. - 13, dorsal paramere; 14, ventral paramere; 15, aedeagus, ventral view. All scales = 0.1 mm

largely yellowish with a small and vague central dark spot at base, hemielytra dark with a roundish yellowish spot medially, immediately behind scutellum narrowly connected with a yellowish transverse mark, medially in posterior third of hemielytra, with an extension along midline to the tip of hemielytra, in addition laterally of the roundish spot behind scutellum a roundish yellowish spot in the centre of each hemielytron connected with a yellowish stripe along lateral margin just behind the tubercle of the clavulus. Thoracic venter greyish, abdominal venter and legs yellowish.

Structural characteristics. - General shape broadly oval with its greatest width about midway the scutellum across the tubercles of the clavuli. Rostrum reaching beyond the apex of the prosternal keel, length of rostral segments 0.06:0.04:0.14:0.18. Humeral width of pronotum two and a half times its median length (1.46/0.58). Scutellum over 1.5 times as wide at base as its median length (1.08/0.61). Hemielytra with well defined regular pits, claval suture absent, clavulus demarcated by a suture. Measurements of leg segments in table 1.

Male. Dorsal paramere with a long parallel apical part (Fig. 13), ventral paramere gradually tapering towards apex (Fig. 14), aedeagus with apex hooked (Fig. 15).

Female unknown.

Etymology.- Latus (latin adjective: broad) refers to the general shape of this species which is broader than in other species.

Comparative notes. - Relatively broader than other species. The dorsal paramere (Fig. 13) is comparatively straight and parallel-sided somewhat similar to that of *N. fragosus* (Fig. 4) which is, however, a smaller species.

***Neotrepes minutus* sp. n.**

(Figs. 12, 16-18)

Type material.- Holotype brachypterous male (DPIC), BRAZIL: MG, São Roque de Minas, Serra da Canastra, base da cachoeira Casca d'Anta, 6.XI.1997, leg. N. Nieser & A.Pelli, N9719. Large pond at foot of waterfall, Helotrephidae mainly collected at edges in small water holes between rocks. Paratypes, same data as holotype 4♂ 5♀ (NCTN, 1♀ DPIC, 1♂ 1♀ ZMAN). São Roque de Minas, Serra da Canastra, actual source area of River São Francisco, 5.XI.1997. Meadows with some marsh plants but dry at time visit, narrow gullies in soil also dried up, some humid to wet *Sphagnum* at edges of gullies. About 500m downstream of «marsh of origin» stream on rocks, water light brown, hyaline, a few plants in cracks in the rock, overhanging vegetation, small pools connected by trickles, in the pools virtually no current, leg. N. Nieser (N9716D), 1♂ 1♀ brach. (NCTN). S. Roque de Minas, Serra da Canastra, top of Cascata Casca d'Anta, 5.XI.1997, leg. A. Pelli (N9717). Stream, width 15-20m, up to over 1.5m deep, somewhat sluggish, open, only a few shrubs at edges, 2♂ 2♀ (PCUB). All brachypterous.

Description, brachypterous specimens. - Generally a small, dark species. Dimensions. Length ♂ 1.71, s = 0.043, ♀ 1.75, s = 0.027; width ♂, 1.14 s = 0.031, ♀ 1.19, s = 0.030; anterior width between eyes ♂ 0.46, s = 0.017, ♀ 0.49, s = 0.022.

Colour. - The part of head between eyes yellow with a light brown median stripe; median part behind eyes blackish; eyes dark brown to blackish, shining. Pronotum dark brown to

blackish with a broad median longitudinal band in posterior half and humeral angles yellow. Scutellum variable, centrally dark margins yellow. Hemielytra with a yellowish median stripe along commissure in posterior half and a narrow yellowish stripe along costal margin behind the projection of the clavulus. In addition the following vague spots on hemielytra, a central spot, a roundish light spot on commissure at the apex of the scutellum and a transverse spot anteriorly on the stripe along commissure. These vague spots are recognizable in teneral specimens but tend to disappear in fully hardened specimens. Venter light brown, legs yellow.

Structural characteristics. - General shape oval, with its greatest width about midway the scutellum across the tubercles of the clavuli. Dorsum sparsely beset with white bristles. The part of the head between eyes with fine pits, the part posterior of eyes with coarser pits. Pronotum with well defined regular pits. Rostrum reaching beyond the posterior margin of the prosternal keel, length of rostral segments 0.06:0.03:0.12:0.13. Humeral width of pronotum two and a half times its median length (1.04/0.40). Scutellum over 1.5 times as wide at base as its median length (0.48/0.30). Hemielytra with well defined regular pits, claval suture absent, clavulus demarcated by a suture. Measurements of leg segments in table 1.

Male. Dorsal paramere with apical part curved and tapering (Fig. 16), ventral paramere with apical part short and stout, aedeagus with apical process short, apically with a slightly expanded round knob (Fig. 17).

Female. Right hemielytron with sensory lobe laterally near apex present but rather weakly developed. Seventh abdominal sternite with a long and narrow median caudal process which is very slightly incised caudally and beset with bristles (Fig. 12).

Etymology. - Minutus (Latin adjective: small) refers to the small size of this species.

Comparative notes. - Of about the same size as *N. transversus*, see under that species. Apart from its small size, females of this species can be separated from the remaining species by the medio-caudal process of the seventh sternite which is relatively longer than in other species. The ventral paramere of the male is similar to that of *N. jaczewskii*, which is, however, distinctly larger with a body length of over 2.2 mm.

***Neotrepes transversus* sp. n.**

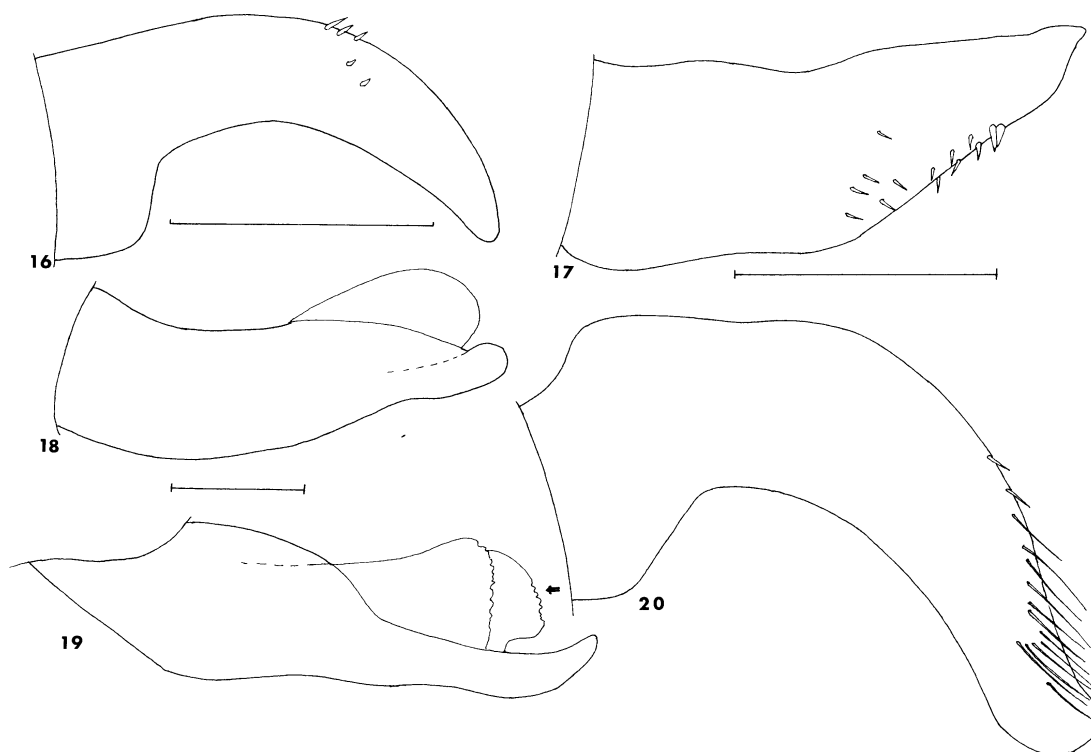
(Figs. 19-22)

Type material.- Holotype brachypterous female (DPIC), BRAZIL: Minas Gerais, Viçosa, 28.IX.1998, leg. A. L. de Melo (ALM98008). Paratypes: Same data as holotype, 1♂ 1♀ brachypterous (NCTN).

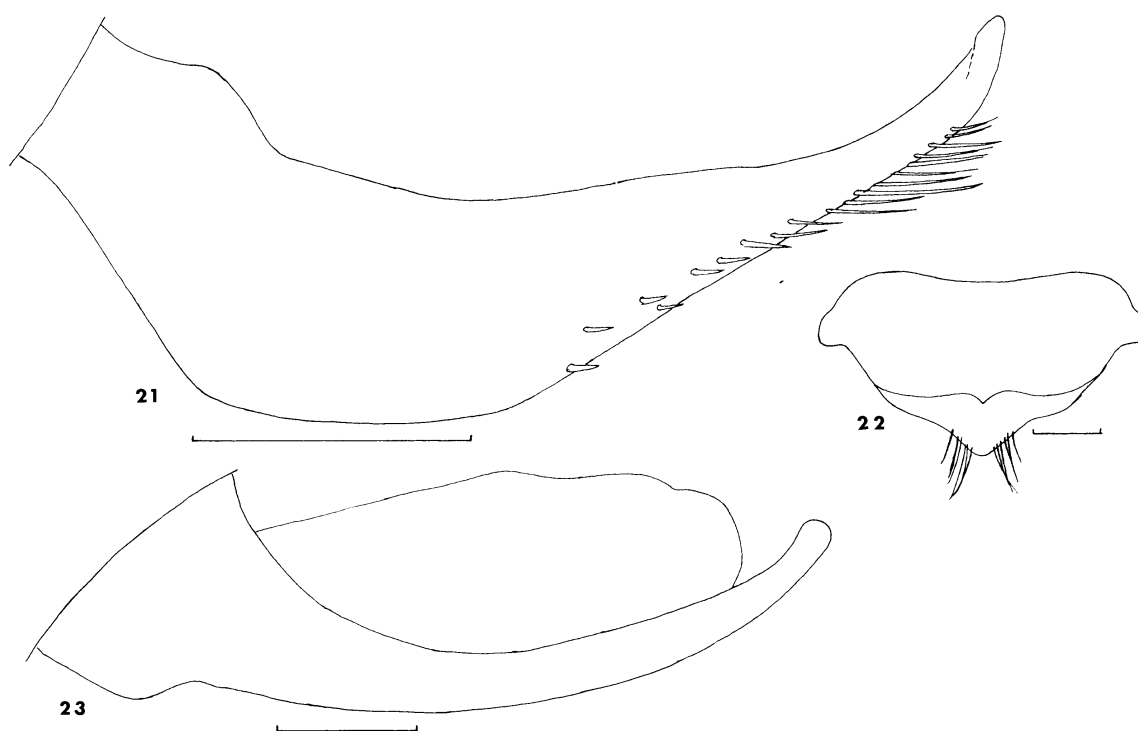
Description, brachypterous specimens. - Generally a medium sized, spotted species. Dimensions. Length ♂ 1.68, ♀ 1.72-1.73; width ♂ 1.12, ♀ 1.20-1.21; width between eyes anteriorly ♂ 0.47, ♀ 0.49-0.49.

Colour. - The part of head between eyes in dorsal, frontal and ventral view yellow, part of head behind eyes black; rostrum dark, eyes black. Pronotum and hemielytra dull black with yellowish to ferruginous markings. Pronotum yellowish except for a narrow stripe along anterior margin medially, which expands to a pair of blackish spots medially of eyes,

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Figs. 16-18 - *Neotrepes minutus* sp. n. paratype male. - 16, dorsal paramere; 17, ventral paramere; 18, aedeagus, ventral view. All scales = 0.1 mm
 Figs. 19-20 - *Neotrepes transversus* sp. n. paratype male. - 19, aedeagus, ventral view, the arrow points to the crenulate outline of the expansion of the aedeagus; 20, dorsal paramere. All scales = 0.1 mm



Figs. 21-22 - *Neotrepes transversus* sp. n. paratypes. - 21, ventral paramere; 22, seventh abdominal sternite of female. All scales = 0.1 mm
 Fig. 23 - *Neotrepes variegatus* sp. n. paratype male, aedeagus, ventral view. All scale = 0.1 mm

which reach about halfway to posterior margin of pronotum. Scutellum yellowish with a dark spot of variable size in posterior part. Hemelytra laterally of scutellum black; posteriorly of scutellum with an irregular transverse yellowish band, which is interrupted near the midline in the male specimen. Posterior part of hemelytra blackish with a median T-shaped yellow spot, the vertical leg of the spot on the hemelytral commissure. Venter yellowish, base and apex of abdomen dark, legs yellowish.

Structural characteristics. - General shape oval with its greatest width about midway the scutellum across the tubercles of the clavuli. Dorsum sparsely beset with white bristles. Rostrum reaching beyond the apex of the prosternal keel, length of rostral segments 0.09:0.05:0.20:0.23. Humeral width of pronotum two and a half times its median length (0.99/0.41). Scutellum over 1.5 times as wide at base as its median length (0.5/0.3). Hemelytra with well defined regular pits. Measurements of leg segments in table 1.

Male. Apex of dorsal paramere slightly expanded, knob-like (Fig. 20), ventral paramere with elongate apical part, aedeagus with apical part elongate (Fig. 21).

Female. Right hemelytron with a sensory lobe laterally near apex (as in Fig. 3). Seventh abdominal sternite with median caudal process comparatively acutely rounded caudally (Fig. 22).

Etymology. - Transversus (Latin adjective: transverse) referring to the alternating black and yellow transverse bands on the dorsum of this species.

Comparative notes. - Of the same size as *N. minutus*, which is a darker species, has a ventral paramere without an elongate apical part (Fig. 17) and the median caudal process of the seventh sternite in female distinctly longer (Fig. 12). The distinct colour pattern reminds of *N. variegatus* which is, however, larger and has the lateral light mark behind the tubercle of the clavulus not connected with the more median mark, the apex of the dorsal paramere tapering (Fig. 24) and the apex of the median caudal process of the seventh sternite in female somewhat more broadly rounded (Fig. 26).

***Neotrepes variegatus* sp. n.**

(Figs. 1, 2, 23-26)

Type material. - Holotype brachypterous male (DPIC), BRAZIL: Minas Gerais, Córrego dos Coelhos at Itauna, at bridge, 1.XI.1997, leg. N. Nieser (N9711B). Margin with overhanging Commelinaceae & Poaceae, *Neotrepes* between the plants hanging/floating in the water. Paratypes, same data as holotype, 3♂ 1♀ brachypterous, 1♀ macropterous (NCTN). Itauna, Córrego dos Coelhos, 1.XI.1997, leg. A. L. de Melo (ALM97021) 1♂ (DPIC). São Roque de Minas, Serra da Canastra, top of cachoeira Casca d'Anta, rock pool, 15.XI.1997 (N9717A), leg. N. Nieser, 1♂. Serra da Canastra, base da cachoeira Casca d'Anta, 6.XI. 1997, leg. N. Nieser & A. Pelli, (N9719). Large pond at foot of waterfall, Helotrephidae mainly collected at edges in small water holes between rocks, 1♂ 3♀. Brachypterous unless otherwise indicated.

Description, brachypterous specimens. - Generally a medium sized, spotted to dark species. Dimensions. Length ♂ 2.15, s = 0.055, ♀ 2.06, s = 0.067; width ♂ 1.51, s = 0.055, ♀ 1.50, s = 0.079; width between eyes anteriorly ♂ 0.58, s = 0.013, ♀ 0.51, s = 0.019.

Colour. - The part of the head between eyes, in dorsal view between eyes, in frontal and ventral view yellow, part of head behind eyes black; eyes black; rostrum brown. Median part of pronotum yellow, medially of eyes a broad longitudinal black band just not reaching the posterior margin of pronotum; lateral part behind eyes black anteriorly, yellow posteriorly (Fig. 1). Scutellum yellowish with a central darker spot. Hemelytra dull black with extensive yellow markings as follows (Fig. 1): with a roundish spot medially immediately behind scutellum narrowly connected with a yellow transverse mark in posterior third of hemelytra, with an extension along midline to the tip of hemelytra; in addition, laterally of the roundish spot behind scutellum a large roundish spot in the middle of each hemelytron and a stripe along lateral margin just behind the tubercle of the clavulus. The large central spot on hemelytra may be connected with the median spot behind scutellum but not with the stripe along lateral margin. Venter of thorax and apex of abdominal venter greyish brown, basal part of abdominal venter sordid yellow, legs yellow.

Structural characteristics. - General shape oval, with its greatest width about midway the scutellum across the tubercles of the clavuli. Rostrum reaching beyond the apex of the prosternal keel, length of rostral segments 0.06:0.06: 0.13:0.14. Humeral width of pronotum over two and a half times its median length (1.32/0.51). Scutellum 1.5 times as wide at base as its median length (0.6/0.4). Measurements of leg segments in table 1.

Male. Dorsal paramere with a tapering apex (Fig. 24), ventral paramere with elongate apical part, aedeagus with apical part neither broad nor long (Fig. 25).

Female. Right hemelytron without a sensory lobe laterally near apex (Fig. 1). Seventh abdominal sternite with a broad median caudal process with a broadly rounded apex (Fig. 26).

Etymology. - Variare (Latin verb: provide with different colours, embroider) refers to the extensive and comparatively distinct lighter pattern of this species.

Comparative notes. - Colour pattern virtually identical with that of *N. fragosus* and *N. lanemelo*, see under *N. fragosus*.

***Neotrepes jaczewskii* China**

Neotrepes jaczewskii China, 1940: 112-117.

Material studied. - BRAZIL: MG, São Roque de Minas, Serra da Canastra, base da cachoeira Casca d'Anta, 6.XI.1997, leg. N. Nieser & A. Pelli. Large pond at foot of waterfall, Helotrephidae mainly collected at edges in small water holes between rocks, 5♂ 5♀ brach., 3 lvV. (NCTN, 1♂ 1♀ 2 lvV DPIC, 1♂ ZMAN).

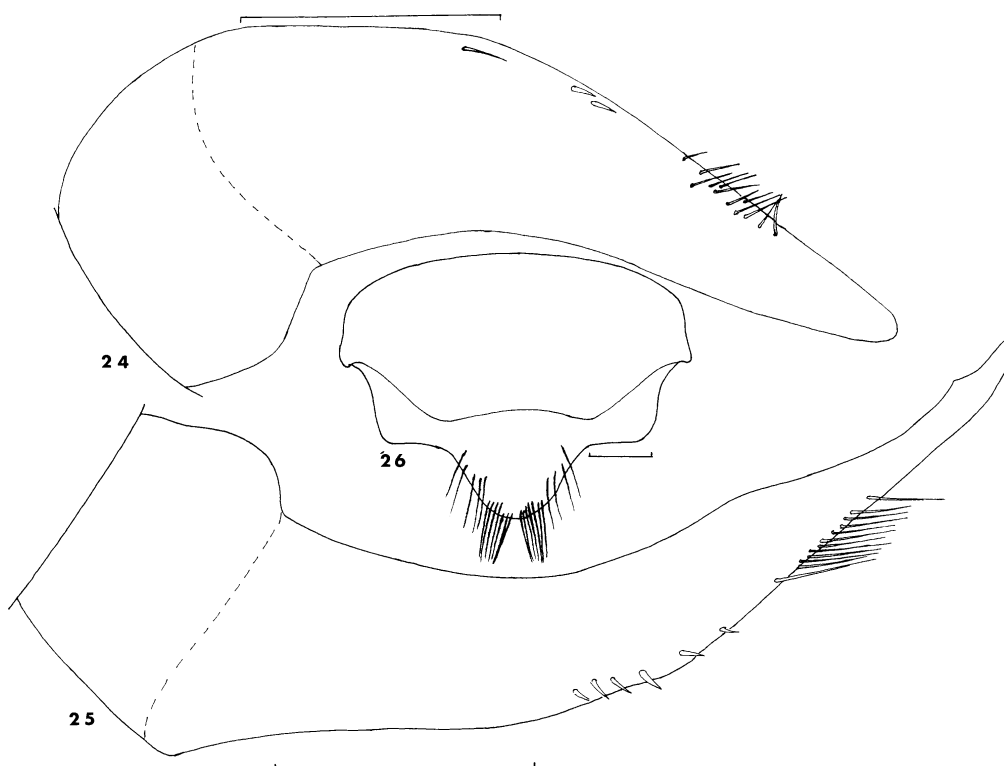
Remark: The specimens cited by Nieser & Lane de Melo (1997) as *N. jaczewskii* belong to different species.

***Neotrepes plaumanni* China**

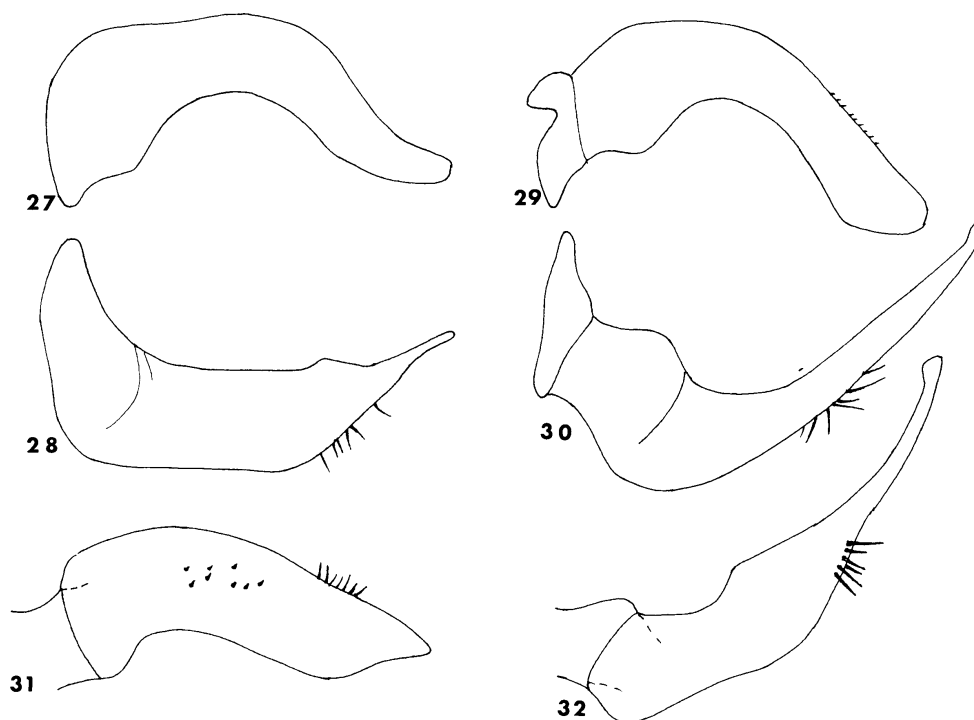
Neotrepes plaumanni China, 1940: 107-112.

Material studied. - Brazil: RJ, Retiro, Petropolis, III.1939, leg. F. Plaumann 1♂ 1♀ (paratypes, BMNH); SP, Serra dos Agudos, Rib. do Poço, 1 000 m asl., XI.1963 (24°12'S/47°59'W) leg. F. Plaumann, 1♂ 2♀ (NCTN); MG, São Roque de Minas, Serra da Canastra, Rio São Francisco, 500 m downstream of Casca d'Anta, 6.XI.1997, *Neotrepes* in small pool with mosses

New species of Neotrephes



Figs. 24-26 - *Neotrephes variegatus* sp. n. paratypes. - 24, dorsal paramere; 25, ventral paramere; 26, seventh abdominal sternite of female. All scales = 0.1 mm



Figs. 27-28 - *Neotrephes jaczewskii* China. - 27, dorsal paramere; 28, ventral paramere.
 Figs. 29-30 - *Neotrephes plaumanni* China.- 29, dorsal paramere; 30, ventral paramere.
 Figs. 31-32 - *Neotrephes usingeri* China. - 31, dorsal paramere; 32, ventral paramere.
 Figs. 27-30 - adapted from China (1940); Figs. 31-32 adapted from China (1936).

Table 1 - Leg measurements (mean in mm) of *Neotrephes*

	femur	tibia	tars1+2	tars3	claw
<i>N. fragosus</i> ♂ n = 5					
fore leg	0.74	0.59	0.14	0.14	0.11
middle leg	0.66	0.43	0.13	0.13	0.11
hind leg	0.74	0.72	0.26	0.27	0.14
<i>N. fragosus</i> ♀ n = 5					
fore leg	0.76	0.61	0.15	0.14	0.09
middle leg	0.69	0.46	0.14	0.14	0.11
hind leg	0.76	0.74	0.28	0.28	0.13
<i>N. lanemelo</i> ♂ n = 5					
fore leg	0.67	0.56	0.14	0.14	0.09
middle leg	0.64	0.41	0.13	0.14	0.09
hind leg	0.69	0.67	0.26	0.26	0.13
<i>N. lanemelo</i> ♀ n = 5					
fore leg	0.70	0.56	0.16	0.13	0.11
middle leg	0.64	0.41	0.14	0.13	0.08
hind leg	0.71	0.71	0.27	0.27	0.13
<i>N. latus</i> ♂ n = 1					
fore leg	0.86	0.63	0.17	0.16	0.13
middle leg	0.80	0.47	0.13	0.14	0.12
hind leg	0.89	0.83	0.33	0.33	0.16
<i>N. minutus</i> ♂ n = 5					
fore leg	0.63	0.46	0.13	0.13	0.08
middle leg	0.56	0.38	0.11	0.13	0.08
hind leg	0.63	0.63	0.25	0.25	0.13
<i>N. minutus</i> ♀ n = 5					
fore leg	0.66	0.49	0.14	0.12	0.08
middle leg	0.60	0.38	0.13	0.11	0.08
hind leg	0.64	0.63	0.26	0.26	0.13
<i>N. transversus</i> ♂ n = 1					
fore leg	0.62	0.44	0.14	0.14	0.09
middle leg	0.59	0.36	0.12	0.12	0.10
hind leg	0.60	0.59	0.26	0.25	0.12
<i>N. transversus</i> ♀ n = 2					
fore leg	0.64	0.51	0.14	0.14	0.10
middle leg	0.56	0.40	0.13	0.13	0.10
hind leg	0.63	0.62	0.26	0.26	0.13
<i>N. variegatus</i> ♂ n = 5					
fore leg	0.81	0.64	0.15	0.14	0.11
middle leg	0.74	0.49	0.16	0.16	0.11
hind leg	0.81	0.77	0.31	0.31	0.13
<i>N. variegatus</i> ♀ n = 4					
fore leg	0.78	0.61	0.16	0.15	0.11
middle leg	0.71	0.48	0.14	0.14	0.11
hind leg	0.82	0.78	0.31	0.31	0.16

and algae, leg. N. Nieser, (N9720), 1♂ 31vIV-V (NCTN). All brachypterous.

Neotrephes usingeri China

Neotrephes usingeri China, 1936: 532-534.

Material studied. - Brazil: SC, Nova Teutônia, 7.V.1935, leg. F. Plaumann, 1♂ (paratype BMNH); Nova Teutônia, Cipó stream, 300-500m asl., I.1953, leg. F. Plaumann, 3♀ (NCTN). All brachypterous.

Acknowledgements

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References

- China, W.E. 1936. The first genus and species of Helotrephidae (Hemiptera) from the New World. **Annals and Magazine of Natural History** (10), 17: 527-538.
- China, W.E. 1940. New South American Helotrephidae (Hemiptera-Heteroptera). **Annals and Magazine of Natural History** (11), 5: 106-126.
- Mahner, M. 1993. Systema cryptoceratorum phylogenetikum (Insecta, Heteroptera). **Zoologica**, 143: i-x, 1-302.
- Nieser, N. 1975. The water bugs (Heteroptera: Nepomorpha) of the Guyana Region. **Studies on the Fauna of Suriname and the other Guyanas**, 16: 1-308, 24 pls.
- Nieser, N. & Lane de Melo, A. 1997. **Os Heterópteros aquáticos de Minas Gerais**. Editora UFMG, Belo Horizonte: 1-177.