

**Revision of the Eurybrachidae (V). Description of the new
Australian genus *Kirkaldybrachys* CONSTANT, 2006 n. g.
(Hemiptera: Fulgoromorpha: Eurybrachidae)**

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Abstract

The new genus of Eurybrachidae *Kirkaldybrachys* CONSTANT n. g. (Hemiptera, Fulgoromorpha) is described for 2 new species from Northern Australia: *K. euronotoides* CONSTANT n. sp. and *K. similis* CONSTANT n. sp. The male genitalia are illustrated and photos of habitus, distribution map, biological data and identification key to the species are provided.

Keywords: Australia, Eurybrachidae, revision, identification key, *Kirkaldybrachys* n. g., *K. euronotoides* n. sp., *K. similis* n. sp.

Résumé

Un nouveau genre d'Eurybrachidae, *Kirkaldybrachys* CONSTANT n. g. (Hemiptera, Fulgoromorpha) est décrit pour 2 espèces nouvelles du Nord de l'Australie: *K. euronotoides* CONSTANT n. sp. et *K. similis* CONSTANT n. sp. Les genitalia mâles sont illustrés et des photos d'habitus, une carte de répartition, des renseignements sur la biologie et une clé de détermination des espèces sont donnés.

Introduction

This paper is the fifth one of a series intended to revise the family Eurybrachidae.

This study starts with the one-by-one revision and (re)definition of the genera and will result in a proposal of a more natural classification in the family. This will also allow tentative understanding of the phylogeny and zoogeography of the family.

The Australian fauna of Eurybrachidae has been largely understudied and, in spite of its richness, only 11 valid genera have been described to date, with 2 of them (*Olonia* STÅL, 1862 and *Platybrachys* STÅL, 1859) having been poorly defined and containing an important number of species that obviously should be placed in separate genera.

Furthermore, an important number of taxa are still undescribed, especially from the Central and Western parts of Australia, while the Eastern part has been better investigated.

A new genus is described here that has been discovered while identifying the abundant material from Australian and American Institutions.

Materials and methods

The dissection of the genitalia is done after boiling the abdomen in glacial acetic acid for a few minutes. The pygofer is then separated from the abdomen and boiled for about one hour in a 10% solution of potassium hydroxide (KOH) with some drops of aqueous solution of chlorazol black. It is then placed in glycerin.

For routine identification, only the acetic acid boiling is done proceeded as the specific structures on the phallic complex are directly visible after moving aside the gonostyli. The genitalia have been placed under the specimen, dry (in a gelatin capsule or glued) or in glycerin. The genitalia of all the males have been checked.

The description of the female genitalia follows BOURGOIN (1993) with additions from the study of SOULIER-PERKINS (1997) and SOULIER-PERKINS & BOURGOIN (1998) on the family Lophopidae.

Hind wings have also been mounted for a number of specimens: they have been glued on transparent plastic rectangles with water-soluble Hoyer's liquid.

The genitalia as well as other characters useful

for identification are figured. A distribution map and photos of habitus are also provided.

The distribution map has been produced by the software *CFP* (BARBIER & RASMONT, 2000).

If necessary, the correct name of the localities is mentioned after the one transcribed from the label. For the labels of the types, each single label is limited by " ". All Holotypes and Paratypes bear red manuscript labels of the following type "Holotype/Paratype ♂/♀ *Kirkaldybrachys euronotoides* n.sp., J. Constant"

Under "Other material examined" are listed specimens in very poor condition or females from places in which no males have been collected and that cannot totally surely be attributed to one species.

The few indications about the biology of the species are provided, as well as an identification key.

The following acronyms are used for the measurements (measurements are taken as in CONSTANT, 2004): BF, breadth of the frons – BT, breadth of the thorax – BTg, breadth of the tegmina – BV, breadth of the vertex – LF, length of the frons – LM, length of the mesonotum – LP, length of the pronotum – LT, total length – LTg, length of the tegmina – LV, length of the vertex.

Acronyms used for the collections (names of the curators in parentheses):

ANIC: Australian National Insect Collection, CSIRO, Canberra, Australian Capital Territory, Australia (T.A. Weir)

ASCT: Agricultural Scientific Collections Unit, Orange Agricultural Institute, Orange, New South Wales, Australia (M. J. Fletcher)

IRSNB: Institut royal des Sciences naturelles de Belgique, Bruxelles, Belgium (P. Grootaert)

LBOB: Lois O'Brien private Collection, Tucson, Arizona, U.S.A.

MJFC: Murray J. Fletcher private collection, Orange, New South Wales, Australia

NHMB: Naturhistorisches Museum Basel, Switzerland (D. Burkhardt)

NTM: Northern Territory Museum, Darwin, Northern Territory, Australia (G. Dally)

SAM: South Australian Museum, Adelaide, South Australia, Australia (J. Forrest)

USNM: National Museum of Natural History, Washington D.C., U.S.A. (S. McKamey)

WADA: Western Australia Department of Agriculture, South Perth, Western Australia, Australia (N. Zilm)

Taxonomic part

Description of the taxa

Genus *Kirkaldybrachys* CONSTANT n. g.

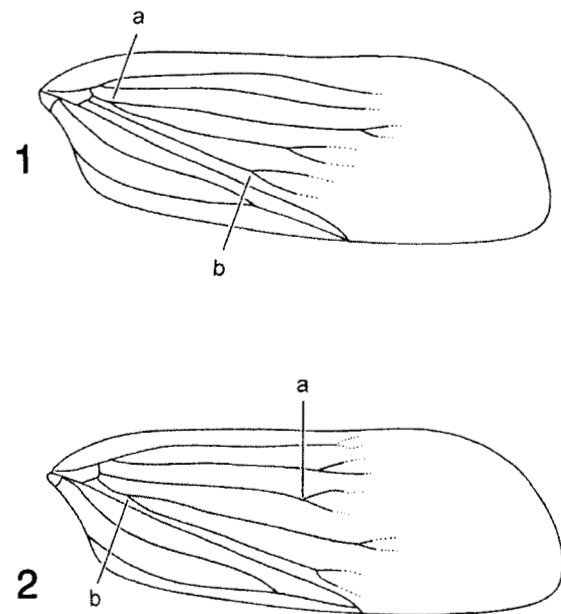
Type-species: *K. euronotoides* CONSTANT n. sp.

Etymology – the name of the new genus is formed by the juxtaposition of Kirkaldy, in memory of the work of the late George Willis Kirkaldy on Australian Homoptera, and *brachys* (Greek) = short, which is a common ending of the genera names among the Eurybrachidae.

Diagnosis – Small sized, brown coloured, dorso-ventrally flattened, Australian genus. It can be recognized by the following combination of characters: (1) tegmina and hind wings not convex, (2) frons less than 2 times broader than long, (3) hind wings brown without white marking, (4) first fork of *M* close to base, (5) first fork of *Cu* at about half of tegmen.

Superficially very similar to *Euronotobrachys* KIRKALDY, 1906. It can be separated from the latter by the lack of a coloured, transverse band on the tegmina and especially by the venation: first fork of *M* at about half of tegmen and first fork of *Cu* at basal 1/4 in *Euronotobrachys* (Figs 1 & 2).

Description – *General coloration*: mainly brown.



Figs 1-2. Main veins of right tegmen, dorsal view (a: first fork of *M*; b: first fork of *Cu*). 1: genus *Kirkaldybrachys* CONSTANT; 2: genus *Euronotobrachys* KIRKALDY.

Head: as broad as thorax; vertex 3.0 - 3.3 times broader than long, concave with fore and hind margins curved and all margins weakly carinate; frons 1.7 - 1.9 times broader than long, not visible in dorsal view, slightly convex, with peridiscal line marked with obsolete tubercles and dorsal margin concave in normal view; clypeus barely reaching median coxae, carinate apically; labium short, barely surpassing median trochanter, with apical segment a little longer than broad and more slender than penultimate; no infra-ocular spine; ocelli absent; antennae elongate, not visible from above, surpassing lateral angle of frons but not eye.

Thorax: about 1.4 - 1.5 times broader than length of pro- and mesonotum together; pronotum with transverse carina parallel to anterior margin and 2 impressed points on disc; hind margin of pronotum sinuate; mesonotum with 3 longitudinal carinae (median one sometimes obsolete); pro- and mesonotum bearing group of obsolete tubercles on each side of disc.

Tegmina: nearly flat, elongate, about 3.0 - 3.2 times longer than broad; costal margin weakly sinuate; sutural margin straight; apex obliquely truncate, with angles rounded, dark with ante-apical transverse paler stripe; clavus closed.

Venation: *C* not distinct; *Sc* & *R* with short common stem; first fork of *M* close to base; first fork of *Cu* at about half of tegmen; *A1* & *A2* fused at about 2/3 of length of clavus.

Hind wings: well developed, brown, sometimes a little darker apically; no white marking; anal area well developed; apex roundly truncate, not reaching apex of tegmen at rest; sutural margin trilobous.

Legs: brown; fore and median femur and tibia elongate, dorso-ventrally flattened, slender, marked with darker rings; tibia III with 3 lateral and 9 apical spines; ventral face of first hind tarsomere with pad of microsetae bordered externally with group of 9 - 10 spines (Fig. 3).

Genitalia ♂: pygofer rather short, strongly sinuate and much narrower dorsally in lateral view; anal tube dorso-ventrally flattened, elongate, ended in hook directed ventrad, furnished dorsally with 2 strong longitudinal ridges and laterally with a number of small teeth; gonostyli laterally flattened, convex and elongate, fused ventrally, with baso-dorsal process directed dorso-cephalad and ended with tooth; phallic complex with elongate, externo-ventral, sclerified process on each side of median, mainly membranous part; between

membranous part and external process, long, sclerified process that surpasses gonostyli.

Genitalia ♀ [based on *K. euronotoides*]: anal tube elongate and narrow, v-shaped in cross section beyond anus, sinuate in lateral view, slightly laminate ventrally; gonoplares unilobous, longer than high, not surpassing anal tube, projecting dorso-laterad; gonapophysis IX elongate, broadly scimitar-shaped, with inner margin curved ventrad; gonocoxae VIII looking like small inflated pouch, projecting laterally; gonapophysis VIII large, dorso-ventrally flattened, rounded at apex; anterior vagina positioned ventrally, membranous, very small compared to posterior vagina; spermatheca attached apically; posterior vagina large, sclerified, dorso-ventrally flattened, concave ventrally, slightly longer than broad, bearing dorsally 2 median, longitudinal ridges; small ridges marking constriction before bursa copulatrix; bursa copulatrix oval-shaped, longer than posterior vagina, with very weak, barely distinct ornamentation.

Sexual dimorphism: no evident sexual dimorphism has been observed.

Size: ♂♂: 6.0-9.0 mm; ♀♀: 7.0-9.4 mm.

Distribution: Northern part of Australia, in Western Australia and in the Northern Territory.

Biology – The only record of a host plant for the genus refers to the tree genus *Acacia* (Mimosaceae).

Note: gonocoxae IX can be attributed to the *Aspidonitys* type (SOULIER-PERKINS, 1997)

***Kirkaldybrachys euronotoides* CONSTANT n. sp.**
Figs 3, 4 A-E & 6-8, Map 1.

Etymology – name formed from the contraction of *Euronotobrachys*, which is the name of a genus of Eurybrachidae from Australia, and *-oides* (Greek) = similar to.

The name refers to the superficial resemblance of the species of the genus *Kirkaldybrachys* CONSTANT n.g. with the species of the genus *Euronotobrachys* KIRKALDY, 1906.

Material examined

Holotype ♂ + 1 Paratype ♀: "NT Rubbish Tip Rd., Maningrida, 12.05 S, 134.13 E, 13 June 1996, G.R. Brown" "Northern Territory Museum Specimen" - *male dissected* [NTM].

6 Paratypes (3♂♂ + 3♀♀): "Melville I., W.D. Dodd" "S.A. Museum specimen" - *the 3 males with one hind wing mounted, one of the females with*

abdomen glued on cardboard label [SAM, 1♂: IRSNB].

3 Paratypes (1♂ + 2♀): "G.F. Hill, 30 m. E Darwin, N.T." "S.A. Museum specimen" - male without head and pronotum, hind wing mounted, one female missing left tegmen [SAM]; second female with hind wing mounted and abdomen dissected [IRSNB].

1 Paratype ♀: "G.F. Hill, Darwin, N.T." "S.A. Museum specimen" - left hind wing mounted and abdomen dissected [SAM].

1 Paratype ♀: "Darwin, N.T., G.F. Hill" "S.A. Museum specimen" - left hind wing mounted and abdomen dissected, left tegmen missing [SAM].

2 Paratypes ♂: "♂" "Australia, N.T., 1 km. W. Kakadu Holiday Village, XI-5-1989, CW. & LB. O'Brien" - dissected [LBOB; IRSNB].

1 Paratype ♂: "Snake Bay N.T., Melville Island, 15.xi.1983, C. Wilson" "Feeding on *Acacia* sp." "3898" "Northern Territory Museum Specimen" [NTM].

Paratypes (1♂ + 1♀): "N.T. Condori billabong nr Jabiru, sample....., 28-29.III.1983, M. Malipatil, A. Sharley" "Northern Territory Museum Specimen" - male dissected, with left hind wing mounted [NTM].

2 Paratypes (1♂ + 1♀): "N.T. Katherine Gorge NP MV—light 4-6 Dec 1980, M.B. Malipatil" "Sweeping grass" "Northern Territory Museum Specimen" - dissected, right hind wing mounted [NTM].

2 Paratypes (1♂ + 1♀): "Brock Creek, Burnside, N. Aust., 28 Mar. 1929, T.G. Campbell" - male dissected [ANIC].

1 Paratype ♀: "Brock Creek, Burnside, N. Aust., 29 Mar. 1929, T.G. Campbell" [ANIC].

Note: correct spelling for "Brock Creek" is "Brocks Creek".

1 Paratype ♀: "Darwin, NT, Juni 1934, Handschin" "*Yarrana continuata* Dist. variety, det. W.E. China, 1934" [NHMB]

Note: this specimen was erroneously reported as *Yarrana continuata* DISTANT, 1906 by LALLEMAND, 1935.

Other material examined

3♀♀: Groote Eylandt, N. Territory, leg. N.B. Tindale [2: SAM, 1: IRSNB]; 1♀: idem, 17-23.VI.1982, leg. J. Major [SAM]; 1♀: Melville Island, leg. W.D. Dodd [SAM]; 1♀: N.T.: 14 km WSW of Mudginbarry HS, 12.39S 132.45E, 25.V.1973, leg. R.S. McInnes [ANIC]; 1♀: N.T., 20 km S of Katherine, 1998, vacuum swept from ground covers in papaya plantation, leg. J. McMahon [ASCU]; 1♀: N.T., Fogg Dam 53 km E by S of Darwin, 12.34S 131.19E, 18.XI.1979, leg. T. Weir [ANIC]; 2♀♀: WA, Wyndham, V.1985, leg. H. Fletcher [ASCU, ex MJFC].



Fig. 3. *Kirkaldybrachys euronotoides* CONSTANT: left hind tarsus, ventral view.

Diagnosis – The species can be recognized by the shape of the male genitalia (e. g. by the gonostyli fused on basal 1/3). Females are impossible to separate from females of *K. similis* if no male is collected together with them.

Description – LT: ♂ (n = 8): 8.2 mm (7.6 to 9.0); ♀ (n = 17): 8.3 mm (7.8 to 9.4).

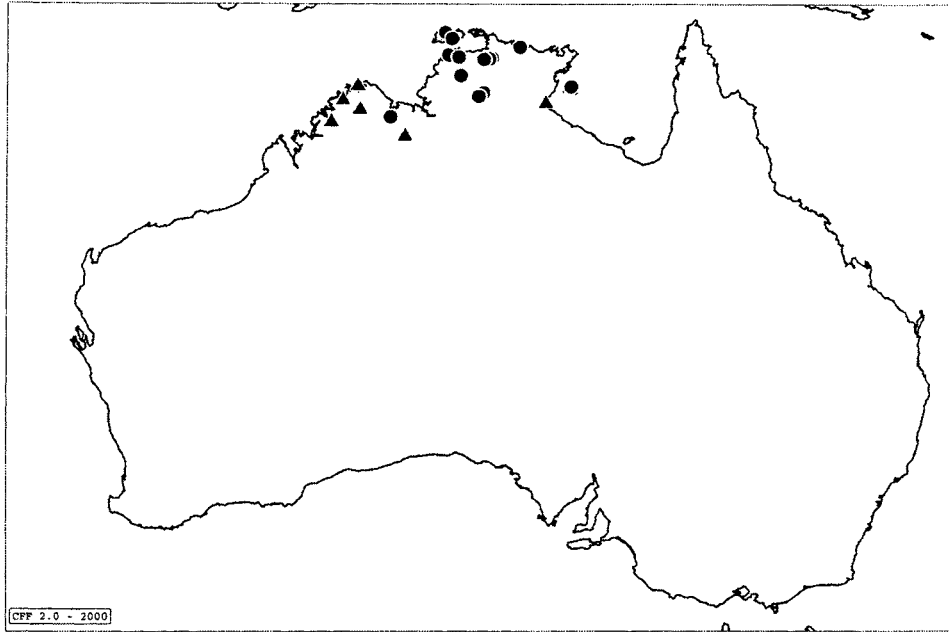
Head: brown with disc of vertex, sides of clypeus and antennae blackish; often 2 poorly distinct paler transverse fasciae on frons; base and carina of clypeus often pale brown; scape short, pedicel little elongate, subcylindrical; ratio BV/LV = 3.0 - 3.2; BF/LF = 1.75.

Thorax: brown to dark brown, usually with margins and carinae paler; often paler markings on disc of pro- and mesonotum; tegulae pale brown; ratio LP+LM/BT = 0.7

Tegmina: brown with irregular darker and paler spots; ante apical pale stripe and costal pale patch near apex separated by dark patch; ratio LTg/BTg = 3.0 - 3.2.

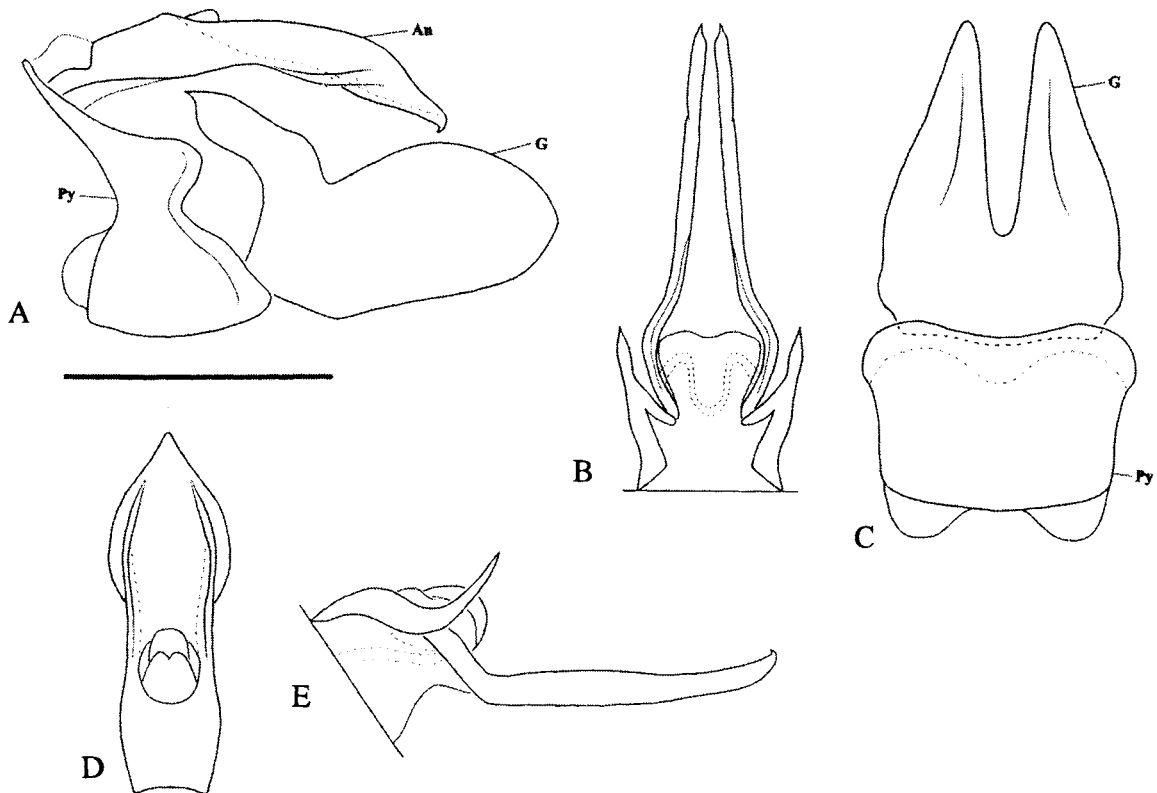
Hind wings: pale to dark brown; apical margin rather straight in middle.

Legs: tibiae I and II brown with 3 - 4 darker rings; femora I and II dark brown with irregular pale markings to pale brown with irregular darker markings; hind femora darker near apex;



● *Kirkaldybrachys euronotoides* Constant
 ▲ *Kirkaldybrachys similis* Constant

Map 1. Distribution of the 2 species of *Kirkaldybrachys* CONSTANT.



Figs 4 A-E. *Kirkaldybrachys euronotoides* CONSTANT: genitalia ♂. A: pygofer, anal tube and gonostyli, left lateral view. B: phallic complex, dorsal view. C: pygofer and gonostyli, ventral view. D: anal tube, dorsal view. E: phallic complex, left lateral view. Scale 1mm.

hind tibiae usually darker at base and apex; all spines of tibiae blackish apically; hind tarsi dark.

Abdomen: reddish brown.

Genitalia ♂: anal tube lanceolate in dorsal view; gonostyli apically rounded in lateral view, elongate and narrowing in ventral view, fused ventrally on basal 1/3, clearly surpassing anal tube; phallic complex with 2 very elongate, straight on apical 2/3, apically hooked process.

Note: fresh specimens are covered with brown-ochraceous dust.

Biology – The species seems to be restricted to the central, Northern part of Australia, in the Arnhem region.

It has been collected feeding on *Acacia* sp. once, by sweeping grass and ground covers and once in a pitfall trap. It is not impossible that the species would feed on some prostrate species of *Acacia*. It seems to be present all year round.

***Kirkaldybrachys similis* CONSTANT n. sp.**

Figs. 5 A-E & 9-11, Map 1.

Etymology – *similis* (Latin) = similar to.

Name given for the close resemblance between this species and the other species known for the genus, *K. euronotoides* n.sp.

Material examined

Holotype ♂: "♂" "14.34S 125.51E, Walsh Point WA, 17 May 1983, I.D. Naumann, J.C. Cardale, ex ethanol" - dissected, right hind wing mounted [ANIC]

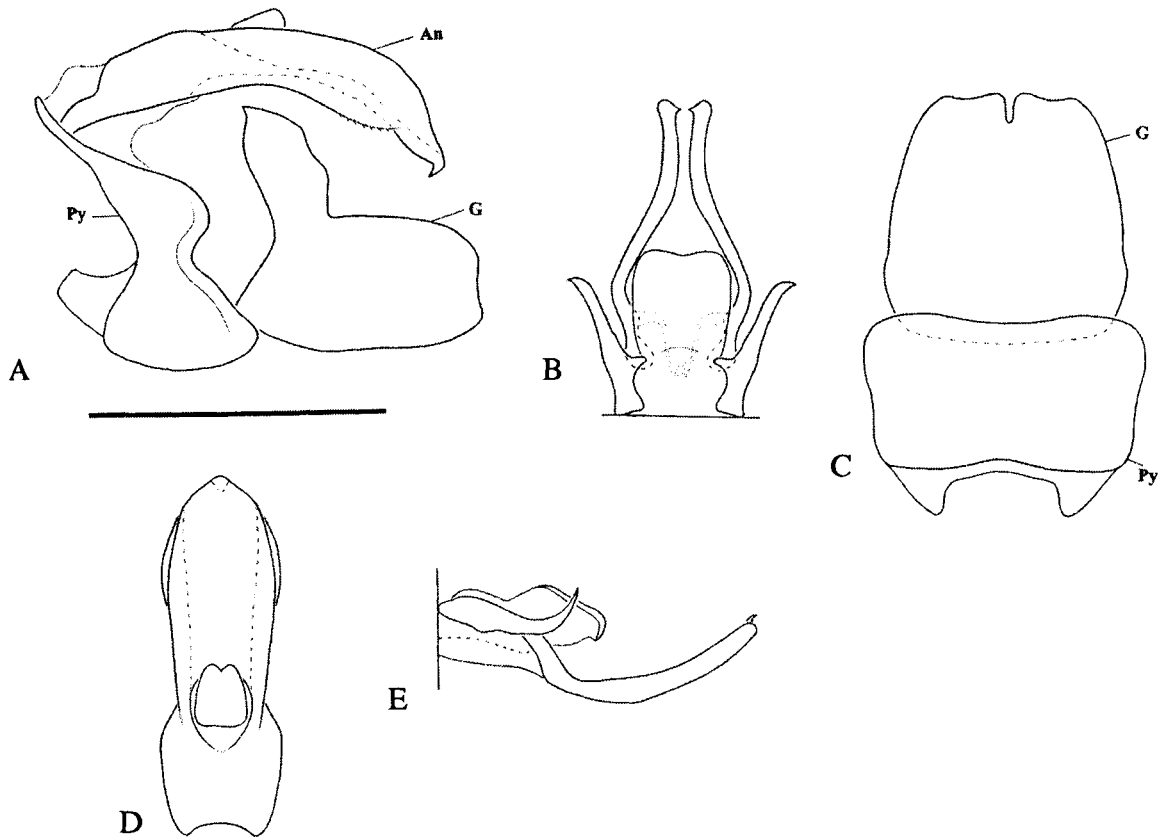
1 Paratype ♂: "Roper R., N. Territory, N.B. Tindale" "S.A. Museum specimen" - dissected, left hind wing mounted, right tegmen missing [SAM]

20 Paratypes (16♂♂ + 4♀♀): "Sir Graham Moore Id, W. Australia" "20 Feb 1945, B Malkin" - 13♂♂ + 2♀♀ dissected, 4♂♂ + 1♀ with hind wing mounted [USNM (13♂♂ + 3♀♀) - IRSNB (2♂♂ + 1♀) - ASCU (1♂)]

1 Paratype ♂: "Argyle Diamond Mine via Kununurra, W.A., 8-V-1985, A. Postle" "c" "Sweeps" "Argyle Diamond Mines Collection, donated 25 June 2001" "Western Australian Museum Entomology Reg no. 33236" - dissected, right hind wing mounted [WAM]

Other material examined

1♀: WA, Prince Regent River Reserve, 15°37'S 125°18'E, 27.VIII.1974, leg. W.J. Bailey & K.T.



Figs 5 A-E. *Kirkaldybrachys similis* CONSTANT: genitalia ♂. A: pygofer, anal tube and gonostyli, left lateral view. B: phallic complex, dorsal view. C: pygofer and gonostyli, ventral view. D: anal tube, dorsal view. E: phallic complex, left lateral view. Scale 1mm.



6



9



7



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8



11

Figs 6-11. 6: *Kirkaldybrachys euronotoides* CONSTANT: habitus, dorsal view. 7: idem: frons, normal view. 8: idem: right hind wing. 9: *Kirkaldybrachys similis* CONSTANT: habitus, dorsal view. 10: idem: frons, normal view. 11: idem: right hind wing.

Richards [WADA]; 1♀: WA, Morgan Falls, 15°02'S 126°40'E, 16-17.VIII.1975, I.F.B. Common & M.S. Upton [ANIC].

Diagnosis – The species can be recognized by the shape of the male genitalia (e. g. by the gonostyli fused on basal 4/5). Females are impossible to separate from females of *K. euronotoides* if no male is collected together with them.

Description – LT: ♂ (n = 16): 7.0 mm (6.0 to 7.5); ♀ (n = 5): 7.4 mm (7.0 to 8.1).

Head: brown with disc of vertex, sides of clypeus and antennae blackish; often obsolete, smooth, paler, median carina on disc of frons up to anterior part of vertex; base and carina of clypeus often pale brown; scape short, pedicel subcylindrical, little elongate; ratio BV/LV = 3.2 - 3.3; BF/LF = 1.8 - 1.9.

Thorax: brown to dark brown, usually with

margins and carinae little paler; often paler markings on disc of pro- and mesonotum; tegulae pale brown; ratio LP+LM/BT = 0.7

Tegmina: brown, usually with apex little darker; ante apical pale stripe and costal pale patch near apex separated by dark patch; ratio LTg/BTg = 3.2.

Hind wings: brown, usually little darker apically; apical margin rounded to rather straight in middle.

Legs: tibiae I and II brown with 3 - 4 darker rings; femora I and II dark brown with irregular pale markings; hind femora darker near apex; hind tibiae usually darker at base and apex; all spines of tibiae blackish apically; hind tarsi with tarsomeres brown, darker near apex.

Abdomen: reddish brown.

Genitalia ♂: anal tube ogival in dorsal view; gonostyli apically truncate, fused ventrally on basal 4/5, projecting little beyond level of anal tube; phallic complex with 2 elongate, sinuate, apically hooked process, surpassing apex of gonostyli.

Note: it is likely that fresh specimens have tegmina covered with brown-ochraceous dust, like *K. euronotoides*.

Biology – The species seems to be restricted to the central, Northern part of Australia, in the Kimberley and Arnhem regions. It has been collected in the months II, V and VIII but the low number of specimens does not allow any conclusions on seasonality in the phenology. It seems that the species can be quite abundant at least locally as 20 from the 24 specimens known to date have been caught on the same day at the same place.

Discussion

The new genus *Kirkaldybrachys* CONSTANT shows important affinities with the genera *Gelastopsis* KIRKALDY and *Euronotobrachys* KIRKALDY in the shape of the male and female genitalia and in the fact that it seems to be related to some species of *Acacia* too (CONSTANT, 2005).

Identification key to the species (males)

- Gonostyli fused on basal 1/3 (recorded from

central Northern Australia)
 . *Kirkaldybrachys euronotoides* CONSTANT

- Gonostyli fused on basal 4/5 (recorded from central Northern Australia)
 2. *Kirkaldybrachys similis* CONSTANT

Acknowledgments

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