

Appendix 5. List of the major differences of the morphological features among the Tiaronthophagus species

female clypeus

ogival-shaped, very wrinkled , with more or less evident points

rufopygus; jossoui; macroliberianus; liberianus; pseudoliberianus

rounded with a notch in the middle, the margin up-turned, more or less wrinkled, with large points on sides

viridiaereus; hemichlorus; lamtoensis; chrysoderus; flexicornis; delahayei; rufobasalis; katanganus; aequatus; angolensis; rougonorum; rufostillans; naevius; ebenus; curtipilis; pendjarius; rolandoi; schaufussi; zavattari; zambesianus

slightly triangular-shaped, anteriorly truncated, wrinkled, with some large points on clypeus surface

saadaniensis

male clypeus

largely ogival, anteriorly margin up-turned , small points on the whole surface, with some larger ones near the genal sutura

angolensis; rufostillans

ogival, the anterior margin up-turned, smooth, with large and larger points mixed

zambesianus

rounded with a notch in the middle, the margin up-turned, smooth, with large points on sides and smaller ones in the middle

viridiaereus; flexicornis

rounded, with some large points mixed to smaller ones, the anterior margin up-turned

schaufussi; zavattari; chrysoderus; rougonorum; lamtoensis; rolandoi; naevius

rounded, the anterior margin up-turned, extremely smooth, some large and many small points

delahayei; aequatus

rounded, the margin slightly notched and up-turned anteriorly, a dense puncture on clypeus

curtipilis

slightly ogival, the anterior margin up-turned and slightly notched with many large and smaller points

pendjarius

slightly ogival, clypeus surface smooth, with some large points mixed to smaller ones, the anterior margin up-turned

katanganus; ebenus; rufobasalis

slightly triangular-shaped, anteriorly truncated, wrinkled, with some large points on clypeus surface

saadaniensis

triangular-shaped, the anterior margin up-turned, with many large and small points mixed

jossoi

triangular-shaped, the anterior margin markedly up-turned, smooth with few large points mixed to smaller ones

macroliberianus; liberianus; pseudoliberianus

triangular-shaped, the anterior margin truncated and up-turned, relatively wrinkled with some large points

rufopygus

male not seen

hemichlorus

vertex carina of female

carina large, reaching the eyes, tricuspidal

liberianus; pseudoliberianus

elongate, triangular-shaped, large, almost reaching the eyes

macroliberianus

lamina very small, trapezoidal straight

lamtoensis

large, reaching the eyes, short, trapezoidal with the base large

pendjarius; rolandoi; schaufussi; zavattari; katanganus

large, rectangular, lowered

jossoi

large, superior margin tricuspidal

delahayei

narrow, small, the superior margin triangular-shaped

curtipilis

narrow, small, the superior margin tricuspidal, straight

rufostillans; angolensis

small, narrow, rounded

zambesianus

short lamina with the base large, almost reaching the eyes

flexicornis

short lamina with the base narrower (never reaching the eyes)

chrysoderus

small, never reaching the eyes, triangular-shaped, short

rufopygus

small pyramidal, placed near the hind margin

saadaniensis

small, narrow, short, trapezoidal-shaped, slightly concave

ebenus, rufobasalis

small, straight triangular-shape, the apex rounded

viridiaereus

small, trapezoidal, relatively narrow

rougonorum

small, tricuspidal, with the central apex higher than the side ones

aequatus

triangular, small up-turned

hemichlorus

tricuspidal, rather large, straight, narrow

naevius

vertex carina of major male

almost ovalar lamina, carrying superiorly an arched cylindrical, short and straight expansion

liberianus; macroliberianus; pseudoliberianus

lamina elongate, trinagular-shaped rectilinear, the apex rounded, never carrying a cylindrical projection

rufopygus

lamina rectangular shaped, very short, then tapering into a triangle and carrying apically a cylindrical long and straight expansion

lamtoensis

lamina trapezoidal inverted , tapering to apex, carrying a long cyliindrical straight projection

rolandoi; schaufussi; zavattari

narrow, very small, never reaching the eyes, straight, elevated, truncated at apex

rougonorum

rectangular lamina but narrowed at the base, carrying superiorly an arched cylindrical expansion anteriorly turned

angolensis; rufostillans; zambesianus

rectangular lamina very narrow, with two pointed expansions on sides and a central straight, short protuberance

jossoi

rectangular lamina, carrying superiorly an arched cylindrical expansion anteriorly turned

chrysoderus

rectangular lamina, carrying superiorly an arched cylindrical, short and straight expansion

flexicornis; katanganus

rectangular, short , tapering to apex and carrying a cylindrical projection

pendjarius; viridiaereus

rectangular, straight, the apex rectilinear

curtipilis

rectangular-shaped, apically tapering and carrying a short rectilinear cylindrical projection

naevius

sinuate rectangular lamina, carrying superiorly an arched cylindrical expansion anteriorly turned

aequatus

sinuate rectangular lamina, in the distal third tapering into a triangle carrying superiorly an arched, small cylindrical expansion anteriorly turned

ebenus; rufobasalis

not seen

delahayei; hemichlorus; saadaniensis

Pronotum disc sculpture

evident, relatively small, thick, ovalar granules

ebenus

evident, rounded, quite large granules, well spaced

aequatus

large ovalar evident granules relatively dense

rufopygus

large very thick granules

saadaniensis

large, evidente ovalar thick granules

zambesianus

large, thick granules

chrysoderus

many large points mixed with very small granules

curtipilis

rounded, evident granules, well spaced

hemichlorus

rounded, relatively dense granules

rolandoi; schaufussi; zavattari

rounded-ovalar, thick granules

jossoi

small, rounded thick granules

naevius; pendjarius; liberianus; macroliberianus; pseudoliberianus

small sparse granules

angolensis; rufostillans

many thick, small granules

rougonorum

thick, relatively large, ovalar granules

rufobasalis

thick, rounded granules

delahayei; flexicornis; katanganus; lamtoensis; viridiaereus

female pronotum tubercles

absent

rufopygus

conical, evident, very close at base, the apices pointed

hemichlorus

conical, relatively large, parallel the apicex pointed

viridiaereus

conical, short, very close along the midline, rectilinear, the apex rounded

flexicornis, *lamtoensis* *pendjarius*

conical, straight, rectilinear

delahayei

conical, the apex rounded , parallel rectilinear

rolandoi

conical, the apex rounded , slightly diverging at apex

schaufussi; *zavattari*

reduced, rounded, very close, sometimes forming a unique line

rougonorum; *curtipilis*

conical, pointed, converging to the base

ebenus; *rufobasalis*

small conical, the apices pointed, close along the midline, the apices diverging

zambesianus; *angolensis*; *rufostillans*; *aequatus*

small, conical, rectilinear, the apices slightly diverging

chrysoderus

two conical, pointed, parallel, close to the midline

liberianus; *pseudoliberianus*; *macroliberianus*

two conical, small, parallel protuberances

naevius

two flat, rounded, expanded, rectilinear projections

katanganus

two rectilinear expansions, straight, very close, expanded, flat on sides

jossoi

two very expanded parallel laminae encircling a large smooth hollow

saadaniensis

Elytral interstriae

evident, very dense granules, evenly distributed on the whole surface

ebenus; rufobasalis

extremely dense, relatively large granules, the surface quite rough

pendjarius; rougonorum; viridiaereus

extremely dense, small granules, the surface almost rough

jossoi

large, uniform flat granules, disposed in two rows

lamtoensis; chrysoderus; curtipilis

small but evident scattered granules, the first two interstriae almost smooth, the points larger and dense on sides

hemichlorus

small, evident, quite dense granules, evenly distributed on the whole surface

liberianus; macroliberianus; pseudoliberianus

small, uniform granules, disposed in two rows

flexicornis; katanganus

very small and sparse granules, the first interstria smooth, the point thicker on sides

schaufussi; zavattari; aequatus; angolensis; delahayei; naevius; rufostillans; rolandoi

very small granules, evenly distributed on the whole surface

rufopygus

very small, evident, regularly distributed in two rows granules

zambesianus

very thick granules, the surface extremely rough

saadaniensis