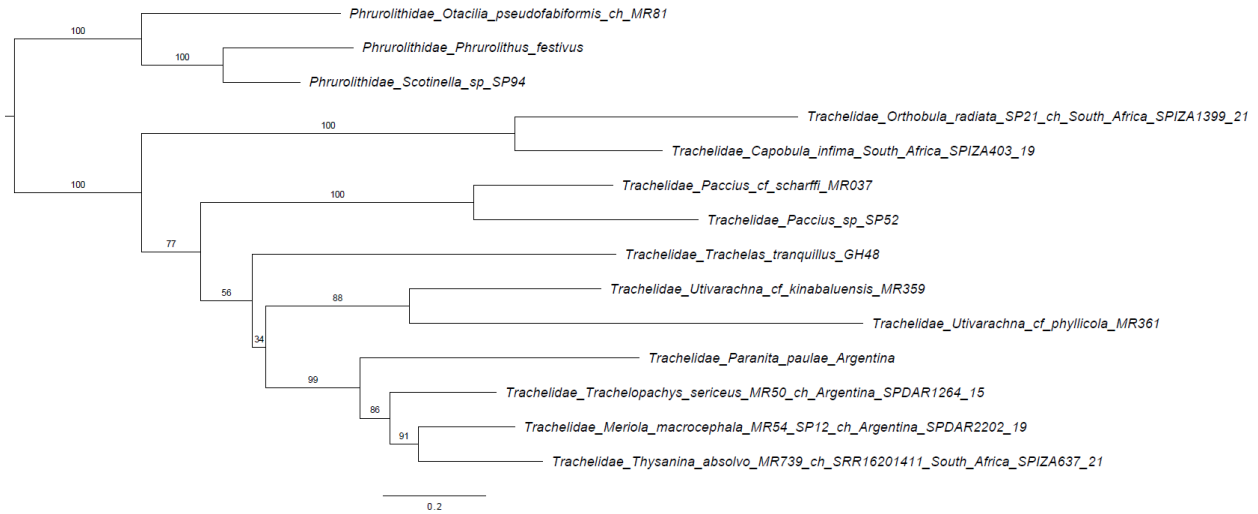
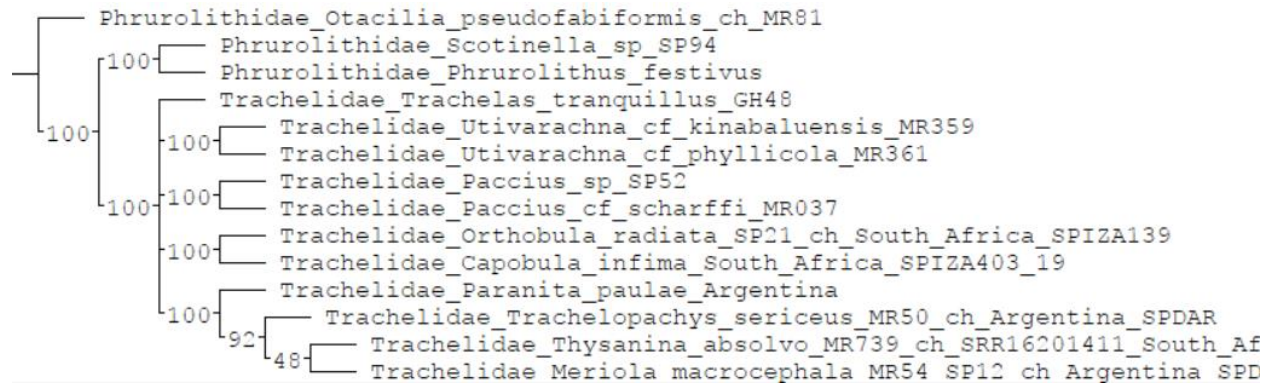


SUPPLEMENTARY FIGURES AND TABLES

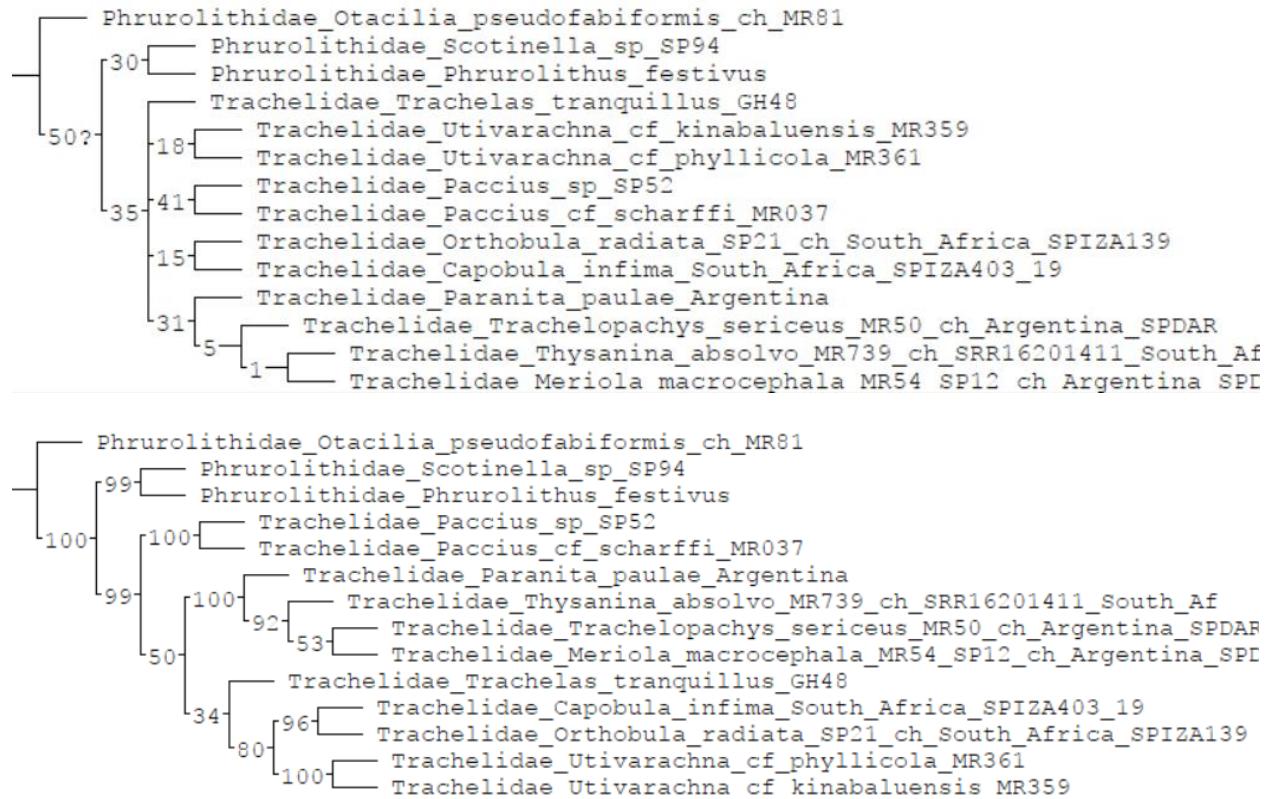
Supplementary Figure S1. Maximum likelihood analysis of the concatenated dataset of six DNA markers and morphology. Support values over branches are bootstrap percentages.



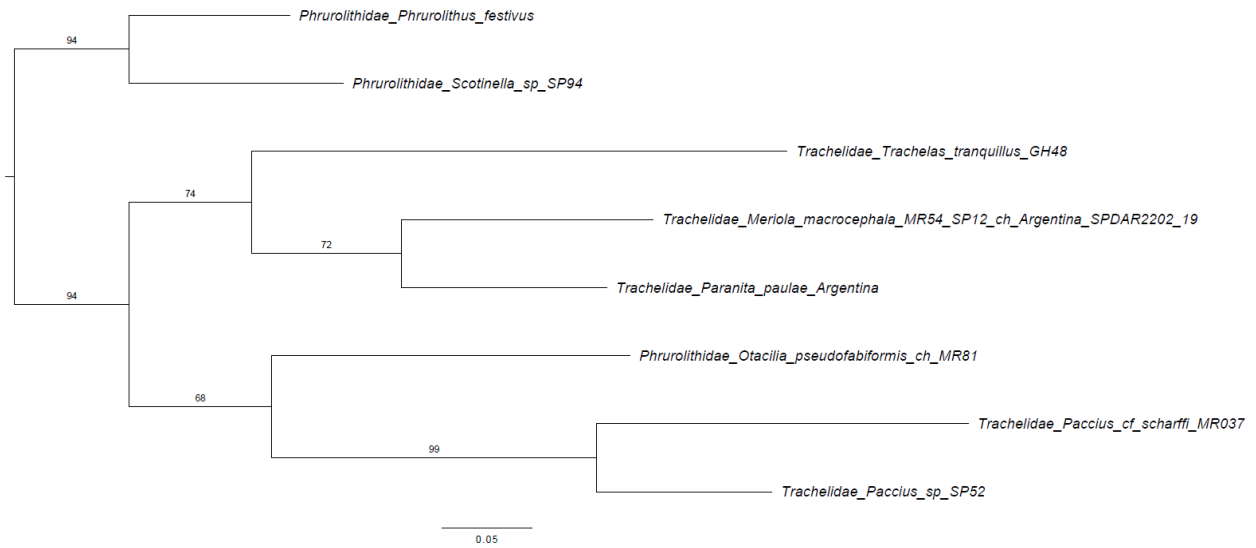
Supplementary Figure S2. Parsimony analysis of the concatenated dataset of six DNA markers and morphology. Support values over branches are jackknifing percentages. (Tree not rerooted.)



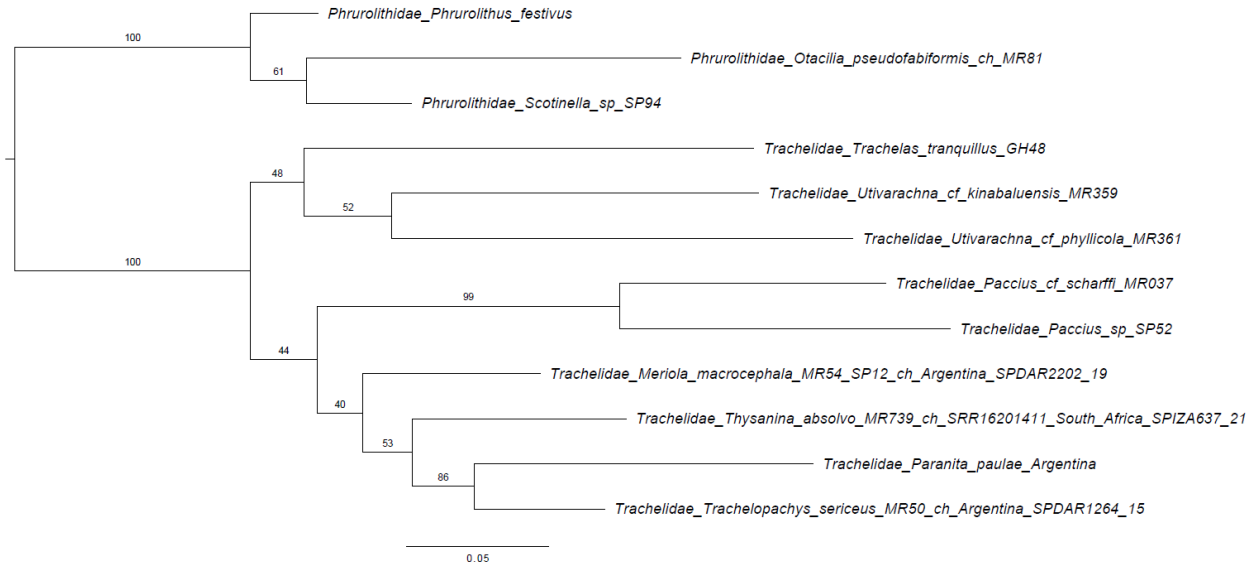
Supplementary Figure S3. Parsimony analysis of the concatenated dataset of six DNA markers and morphology. Support values over branches are Bremer values (top tree) or jackknifing percentages (bottom tree). (Trees not rerooted.)



Supplementary Figure S4. Maximum likelihood analysis of the marker 12s. Support values over branches are bootstrap percentages.



Supplementary Figure S5. Maximum likelihood analysis of the marker 16s. Support values over branches are bootstrap percentages.



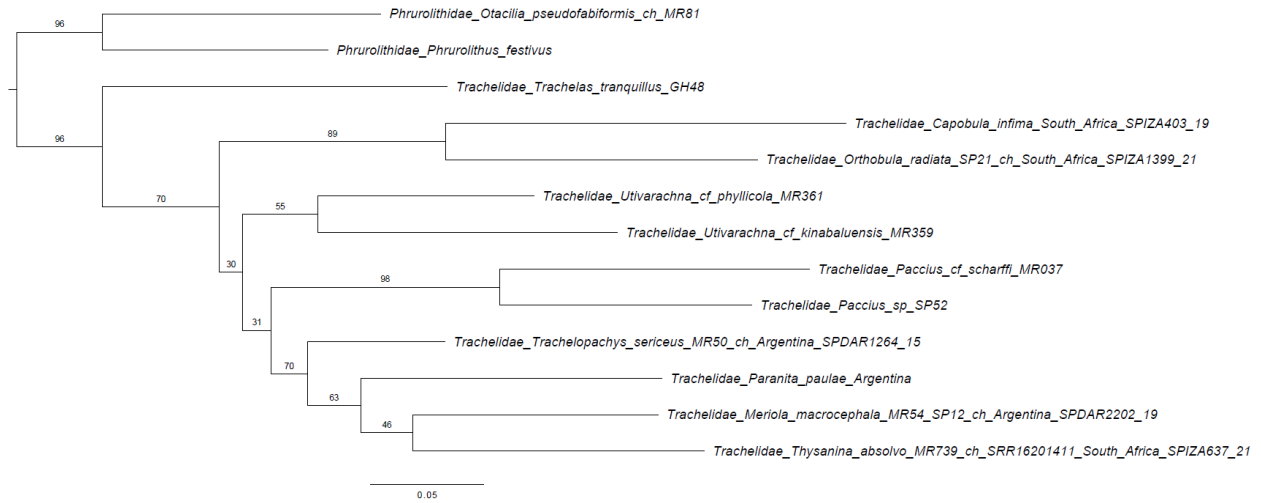
Supplementary Figure S6. Maximum likelihood analysis of the marker 18s. Support values over branches are bootstrap percentages.



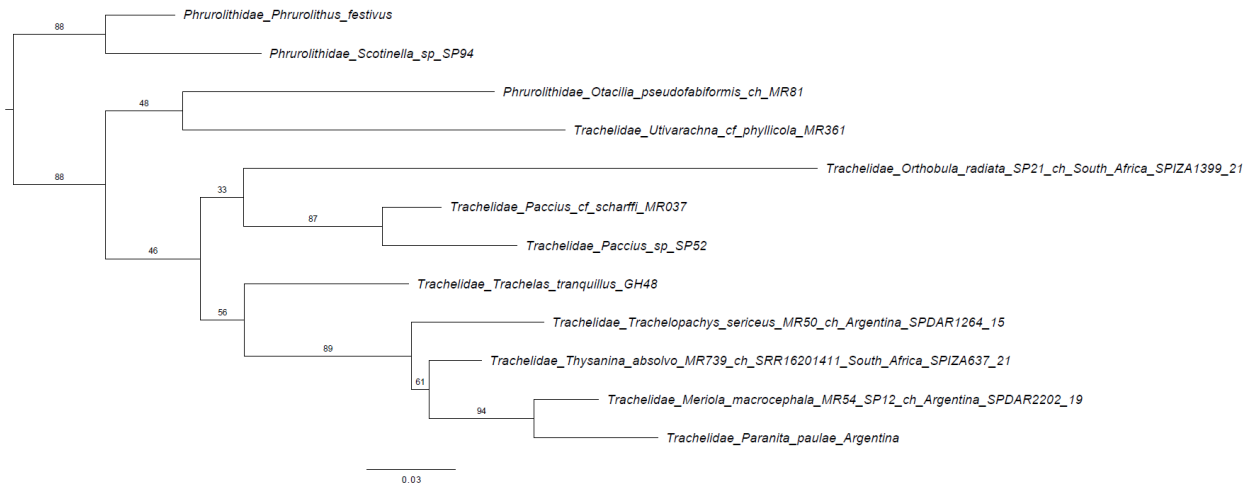
Supplementary Figure S7. Maximum likelihood analysis of the marker 28s. Support values over branches are bootstrap percentages.



Supplementary Figure S8. Maximum likelihood analysis of the marker co1. Support values over branches are bootstrap percentages.

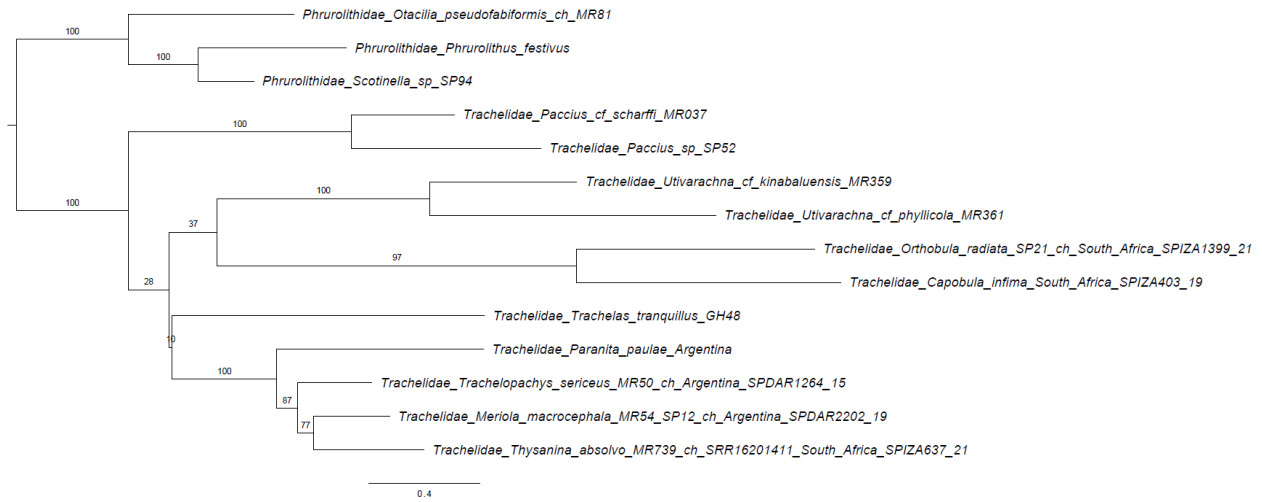


Supplementary Figure S9. Maximum likelihood analysis of the marker h3. Support values over branches are bootstrap percentages.

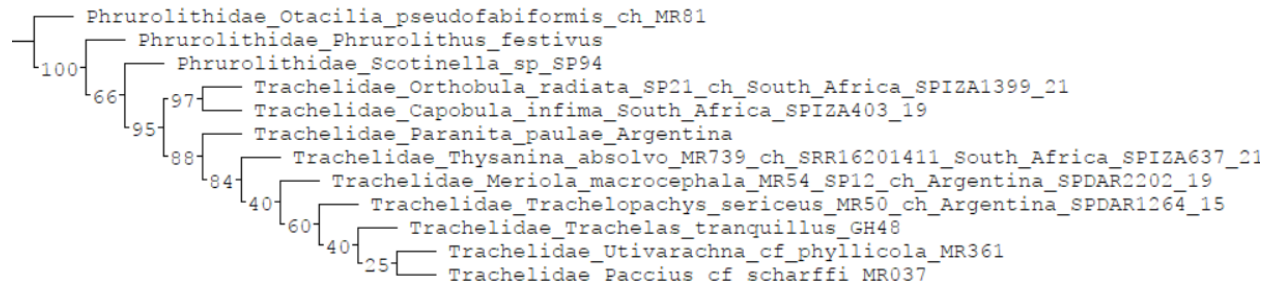


Supplementary Figure S10. Maximum likelihood analysis of the concatenated six DNA markers.

Support values over branches are bootstrap percentages.

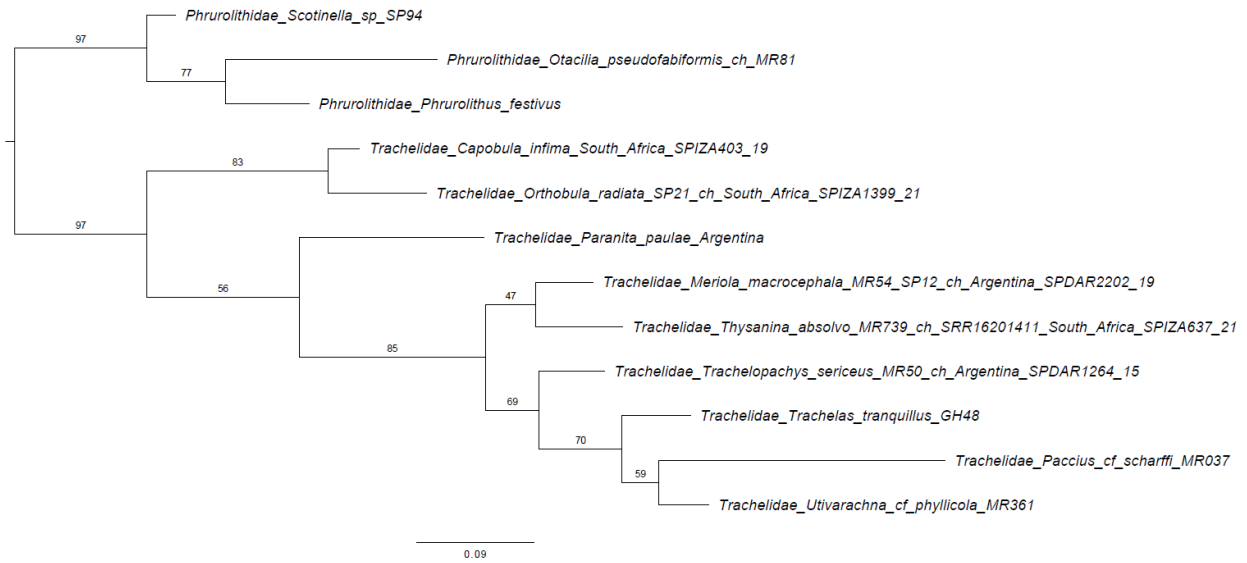


Supplementary Figure S11. Parsimony analysis of the morphological dataset. Support values over branches are jackknifing percentages.



Supplementary Figure S12. Maximum likelihood analysis of the marker of the morphological data.

Support values over branches are bootstrap percentages.



Supplementary Table S1. GenBank accession numbers and data sources. New sequences in boldface. Asterisk (*) when the sequence available is from another gene fragment, thus not used for this analysis. Abbreviations: PHR, Phrurolithidae; TRC, Trachelidae

| Family | Terminal | 12s | 16s | 18s | 28s | co1 | h3 | morphology | Sanger sources |
|--------|---|-----------------------|----------|-----------------------|-----------------------|--|----------|---|--|
| PHR | <i>Otacilia</i> sp. MR81 | KY015510 | KY016037 | KY016615 | KY017269 | MZ407589 (<i>Otacilia</i> <i>pseudofabiformis</i>) | KY018355 | Ramírez (2014), Azevedo <i>et al.</i> (2022a) (<i>Otacilia</i> sp. Ha Tinh) | Wheeler <i>et al.</i> (2017), Liang <i>et al.</i> (2021) Briscoe <i>et al.</i> (2013), |
| PHR | <i>Phrurolithus festivus</i> | bycatch SRR1620143 | | bycatch SRR1620143 | bycatch SRR1620143 | | | Ramírez (2014), Azevedo <i>et al.</i> (2022a) | bycatch from Azevedo <i>et al.</i> (2022a) |
| PHR | <i>Scotinella</i> sp. SP94 | KY015511 | KY016038 | KY016616 | KY017270 | --- | KY018356 | Azevedo <i>et al.</i> (2022a) (<i>Scotinella</i> <i>pugnata</i>) | Wheeler <i>et al.</i> (2017) |
| TRC | <i>Capobula infima</i> | --- | --- | --- | --- | BOLD: SPIZA403-19 | | Haddad <i>et al.</i> (2021) | Haddad <i>et al.</i> (2021) |
| TRC | <i>Meriola macrocephala</i> | KY015649 | KY016205 | KY016806 | KY017467 | BOLD: SPDAR2202-19 | KY018511 | Ramírez (2014), Azevedo <i>et al.</i> (2022) | Wheeler <i>et al.</i> (2017) |
| TRC | <i>Orthobula radiata</i> | --- | --- | KY016808 | KY017468 | BOLD: SPIZA1399-21 | KY018513 | Ramírez (2014), Azevedo <i>et al.</i> (2022a) (<i>Orthobula</i> <i>calceata</i>) | Wheeler <i>et al.</i> (2017, SP21 = <i>Orthobula</i> <i>radiata</i>); Haddad <i>et al.</i> (2021) |
| TRC | <i>Orthobula</i> sp. MR362 | --- | KY016206 | KY016807 | --- | --- | KY018512 | --- | Wheeler <i>et al.</i> (2017) |
| TRC | <i>Paccius</i> cf. <i>scharffi</i> MR037 | KY015650 | KY016207 | KY016809 | KY017469 | KY018021 | KY018514 | Ramírez (2014), Azevedo <i>et al.</i> (2022a) | Wheeler <i>et al.</i> (2017) |

| | | | | | | | | | |
|-----|--|-----------------------------------|-----------------------------------|------------------------------------|------------------------------------|--|-----------------------------------|--|--|
| TRC | <i>Paccius</i> sp. SP52 | KY015651 bycatch SRR1620141 | KY016208 bycatch SRR1620141 | KY016810 bycatch SRR1620141 | KY017470 bycatch SRR1620141 | KY018022 OR515542, BOLD: CORAR075 | KY018515 bycatch SRR1620141 | --- Ramírez (2014), Azevedo <i>et al.</i> (2022a) | Wheeler <i>et al.</i> (2017) bycatch from Azevedo <i>et al.</i> (2022a) |
| TRC | <i>Paranita paulae</i> | 3 | 3 | 3 | 3 | | | | |
| | | | | KY016811, bycatch SRR1620141 | KY017471, bycatch SRR1620141 | BOLD: SPIZA637-21 | | Azevedo <i>et al.</i> (2022a) | Wheeler <i>et al.</i> (2017); Haddad <i>et al.</i> (2021) |
| TRC | <i>Thysanina absolvo</i> | --- | 1 | 1 | SRR1620141 | | KY018516 | Ramírez (2014), Azevedo <i>et al.</i> (2022a) (<i>Trachelas</i> <i>mexicanus</i>) | |
| TRC | <i>Trachelas tranquillus</i> | KY015652 | KY016209 | KY016812 | KY017472 | KY018023 | KY018517 | Ramírez (2014), Azevedo <i>et al.</i> (2022a) | Wheeler <i>et al.</i> (2017) |
| | <i>Trachelopachys</i> <i>sericeus</i> | --- | KY016210 | KY016813 | KY017473 | OR515543, BOLD: SPDAR 1264-15 | KY018518 | (<i>Trachelopachys</i> <i>ammobates</i>) | Wheeler <i>et al.</i> (2017) |
| TRC | <i>Utivarachna</i> cf. <i>U.</i> <i>kinabaluensis</i> MR359 | --- | KY016211 | KY016814 | --- | KY018025 | --- | --- | Wheeler <i>et al.</i> (2017) |
| | <i>Utivarachna</i> cf. <i>U.</i> <i>phyllicola</i> MR361 | --- | KY016212 | KY016815 | KY017474 | KY018026 | KY018519 | Deeleman-Reinhold (2001) (<i>Utivarachna</i> <i>phyllicola</i>) | Wheeler <i>et al.</i> (2017) |

Supplementary Table S2. Synapomorphies common to the 13 different tree topologies that occurred in the 1000 ultrafast bootstrap pseudoreplicates, which conform to the reference topology of Figure 17 (*i.e.*, topologies with low frequency were not considered). Node numbers refer to the following consensus tree:



Synapomorphies common to 13 trees

(Node numbers refer to nodes in consensus)

Phrurolithidae *Otacilia pseudofabiformis* ch MR81 :

All trees:

retrocoxal hymen (102): absent → leg I

femoral dorsal median line macrosetae (147): all absent → present at least one

scales (=feathery scales and all bent setae) (158): absent → present

spigot shaft surface (241): longitudinally ridged → smooth

MaAm number in male (259): one plus nubbin (generally with Ta visible), or one no nubbin (there may be a Tp) → two (generally with Ta visible)

Pi spigot base cuticle texture (262): longitudinal ridges → smooth

male PMS Ac number (281): 1 → 0

male palp tibia ventral apical process (well defined from RTA) (326): absent or simple swelling or part of RTA → present

cymbial retrobasal process (includes paracymbium) (342): absent → present

embolar basal process (359): absent → present

Some trees:

palpal claw teeth (86): no teeth → one to several teeth

male epigastric sclerite (208): present → absent

Phrurolithidae *Phrurolithus festivus* :

All trees:

anterior eye row curvature (9): approximately straight → notably procurved

RTA sclerotization (320): all sclerotized → with membranous area

Phrurolithidae *Scotinella* sp SP94 :

All trees:

tarsal scopula of tenent setae (162): absent → present

Trachelidae *Capobula infima* South Africa SPIZA403 19 :

All trees:

female inframammillary sclerite (211): absent → present

male palp patella retrolateral apophysis (315): absent → present

Trachelidae *Meriola macrocephala* MR54 SP12 ch Argentina SPDAR2202 19 :

All trees:

male epigastric sclerite (208): absent → present

postepigastric invaginations (213): absent → present

Trachelidae *Orthobula radiata* SP21 ch South Africa SPIZA1399 21 :

All trees:

carapace posterior reflexed border (4): narrow or not reflexed → wide reflexed border

superior tarsal claw teeth insertion line (142): median line → ectal line

ventral postepigastric scutum (210): absent → present in male

Some trees:

chilum (30): present → absent

Trachelidae *Paccius cf scharffi* MR037 :

All trees:

No autapomorphies:

Trachelidae *Utivarachna cf phyllicola* MR361 :

All trees:

No autapomorphies:

Trachelidae *Paranita paulae* Argentina :

All trees:

thoracic fovea (0): present → absent

pits on carapace (5): absent → present

short medially thickened female palpal tarsus (82): absent → present

tarsal cuticle texture (100): smooth → fingerprint

macrosetae with apical tenent surface on leg I (156): absent → present

claw lever file-claw tuft bases interaction (172): interlocking → interlocking plus wide

ventral wings

dorsal scutum on male abdomen (206): present → absent

endites sexual dimorphism (309): not dimorphic → male ectal-anterior concavity

male palp femur ventral longitudinal groove (313): absent → present

male palp patella retrolateral apophysis (315): absent → present

cymbial apical ventral setae (332): sparse regular → bunch thick

cymbial tip apical thick setae (333): present → absent

Some trees:

spination legs I-II dramatically reduced (144): virtually no spines → with spines

female leg cuspules (=short macrosetae) (151): present → absent

sexually dimorphic leg macrosetae-cuspules (152): macrosetae reduced to cuspules in male

→ leg cuspules absent

tarsal scopula of tenent setae (162): present → absent

claw tuft base rectangular blocks (168): rectangular blocks trachelinae → cylindrical,
folded or irregularly widened no blocks

female PMS MiAm number (277): one plus nubbin (generally with Tp visible) → two
(generally with Tp visible)

male PMS MiAm number (278): one plus nubbin (generally with Tp visible) → two
(generally with Tp visible)

PMS Cy number (288): 5 → 4

Trachelidae Thysanina absolvo MR739 ch SRR16201411 South Africa SPIZA637 21 :

All trees:

dorsal scutum on male abdomen (206): present → absent

cymbial tip apical thick setae (333): present → absent

MA (363): absent → present

Some trees:

female leg cuspules (=short macrosetae) (151): present → absent

Trachelidae Trachelas tranquillus GH48 :

All trees:

carapace posterior reflexed border (4): narrow or not reflexed → wide reflexed border

Some trees:

chilum configuration (31): single median sclerite → paired isolated sclerites

metatarsal preening comb (117): distinct comb → brush or absent

claw tuft seta basal section folds (165): with folds or ribs → about cylindrical

abdomen anterior dorsal strong curved setae (214): absent → present

embolus screw-shaped (361): absent → present

Trachelidae Trachelopachys sericeus MR50 ch Argentina SPDAR1264 15 :

All trees:

chilum configuration (31): single median sclerite → paired isolated sclerites

PMS Cy number (288): 5 → many

PLS Cy number (300): 2 → 3

embolar basal process (359): absent → present

conductor (366): absent → present

Some trees:

palpal claw teeth (86): no teeth → one to several teeth

sternum texture (92): smooth → rugose setal bases raised

PLS MS (301): present → absent

Trachelidae Paccius sp SP52 :

All trees:

No autapomorphies:

Trachelidae Utivarachna cf kinabaluensis MR359 :

All trees:

No autapomorphies:

Node 15 :

All trees:

No synapomorphies

Node 16 :

All trees:

fovea height relative to cephalon (2): fovea as high or fovea lower → fovea highest

Node 17 :

All trees:

thoracic fovea (0): present → absent

pits on carapace (5): absent → present

endites obliquely depressed (70): absent → present

macrosetae with apical tenent surface on leg I (156): absent → present

claw lever file-claw tuft bases interaction (172): interlocking → interlocking plus wide

ventral wings

MaAm number in female (254): one plus nubbin (generally with Tp visible) → one no nubbin (there may be a Tp)

male palp femur ventral apical apophysis (312): absent (or only median) → present (may have median plus apical process)

cymbial tip ventral groove (329): absent → present

cymbial tip apical thick setae (333): present → absent

Some trees:

abdomen anterior dorsal strong curved setae (214): absent → present

Node 18 :

All trees:

No synapomorphies

Node 19 :

All trees:

trochanter distal ventral margin notch (105): shallow or absent → deep at least legs I-II

femoral dorsal median line macrosetae (147): all absent → present at least one

Node 20 :

All trees:

claw-claw tuft clasping mechanism structure (171): solid → teeth appressed together

epigynum lobes (372): undivided plate suture not visible → LL+MF delimited by furrows or sutures

Node 21 :

Some trees:

male epigastric sclerite surrounding pedicel base (209): present closed tube → absent

epiandrous spigots (215): present → absent

Node 22 :

All trees:

female PMS Ac number (280): 0 → 4 or more

Some trees:

spination legs I-II dramatically reduced (144): with spines → virtually no spines

female leg cuspules (=short macrosetae) (151): absent → present

sexually dimorphic leg macrosetae-cuspules (152): leg cuspules absent → macrosetae

reduced to cuspules in male

tarsal scopula of tenent setae (162): absent → present

claw tuft base rectangular blocks (168): cylindrical, folded or irregularly widened no

blocks → rectangular blocks trachelinae

Pi number configurations by sex (272): female several Pi male none to three → male and female more than three Pi

male PMS Ac number (281): 1 → 4 or more

globose membranous extension of proximal CD (382): present → absent

Node 23 :

All trees:

No synapomorphies

Node 24 :

All trees:

No synapomorphies