**Supplementary**

**Table S1.** Information on the 39 mitogenomes of Tenebrionidae and two outgroups used in this study.

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| --- | --- | --- | --- |
| **Subfamily** | **Species** | **GenBank no.** | **Reference** |
| Meloinae (out group) | *Mylabris* sp. | JX412732 | *Timmermans et al. (2016)* |
| Oedemerinae (out group) | *Oedemera virescens* | HQ232826 | *Timmermans et al. (2010)* |
| Pimeliinae | *Asbolus verrucosus* | NC\_027256 | *Rider (2016)* |
|  | *Stenomorpha consobrina* | MZ342785 | *Smith et al. (2021)* |
|  | *Stenomorpha obovata* | MZ342786 | *Smith et al. (2021)* |
|  | *Pelecyphorus contortus* | MZ342780 | *Smith et al. (2021)* |
|  | *Pelecyphorus foveolatus* | MZ342781 | *Smith et al. (2021)* |
|  | *Philolithus aegrotus* | MZ342784 | *Smith et al. (2021)* |
|  | *Machla sappho* | MZ342778 | *Smith et al. (2021)* |
| Lagriinae | *Adelium* sp. | FJ613422 | *Sheffield et al. (2009)* |
|  | *Chrysolagria* sp. | JX412760 | *Timmermans et al. (2016)* |
|  | *Paratenetus tropicalis* | JX412774 | *Timmermans et al. (2016)* |
|  | *Anaedus unidentasus* | ON303730 | In this study |
|  | *Spinolyprops cribricollis* | ON303729 | In this study |
|  | *Cerogira janthinipennis* | ON303727 | In this study |
|  | *Cerogria popularis* | NC\_061196 | *Liu et al. (2022)* |
|  | *Luprops yunnanus* | ON303728 | In this study |
| Tenebrioninae | Amarygmini sp. | MH789725 | *Alex et al. (2015)* |
|  | *Paramarygmus* sp. | JX412808 | *Timmermans et al. (2016)* |
|  | *Tenebrio molitor* | NC\_024633 | *Liu & Wang (2014)* |
|  | *Tenebrio obscurus* | MG739327 | *Bai et al. (2018)* |
|  | *Tribolium confusum* | NC\_026702 | *Ou et al. (2015)* |
|  | *Tribolium castaneum* | NC003081 | *Timmermans et al. (2016)* |
|  | *Zophobas atratus* | MK140669 | *Bai et al. (2019)* |
|  | *Alphitobius diaperinus* | MT610905 | *Hong et al. (2020)* |
|  | *Eutrapela* sp. | JX412754 | Unpublished |
|  | *Eutrapela ruficollis* | HQ232805 | Timmermans et al. (2010) |
| Blaptinae | *Blaps rynchopetera* | MN267802 | *Yang et al. (2019)* |
|  | *Gonocephalum kochi* | MW822744 | In this study |
|  | *Gonocephalum outreyi* | KU236386 | *Song et al. (2018)* |
|  | *Opatrum sabulosum* | MN745102 | Unpublished |
| Alleculinae | *Cteniopus* sp. | KX087267 | Unpublished |
|  | Alleculinae sp. | JX412818 | Unpublished |
| Diaperinae | *Platydema* sp. | JX412842 | *Timmermans et al. (2016)* |
|  | *Crypsis chinensis* | ON303731 | In this study |
|  | *Martianus dermestoides* | KM046492 | *Wang et al. (2016)* |
|  | *Scaphidema metallicum* | KX087341 | Directly submitted |
| Stenochiinae | *Strongylium suspicax* | JX412780 | *Timmermans et al. (2016)* |
|  | *Promethis valgipes* | MW201671 | *Bai et al. (2021)* |
|  | *Morphostenophanes yunnanus* | MW822745 | In this study |
|  | *Morphostenophanes yunnanus* | MZ298928 | Directly submitted |



**Figure S1.** The mitogenome maps of *Anaedus unidentasus*, *Cerogira janthinipennis*, *Luprops yunnanus*, *Spinolyprops cribricollis*.



**Figure S2.** The mitogenome maps of*Gonocephalum kochi*, *Morphostenophanes yunnanus* and *Crypsis chinensis*.



**Figure S3.** The inferred secondary cloverleaf structure for the tRNAs *Anaedus unidentasus*.



**Figure S4.** The inferred secondary cloverleaf structure for the tRNAs of *Cerogira janthinipennis*.



**Figure S5.** The inferred secondary cloverleaf structure for the tRNAs of *Luprops yunnanus*.



**Figure S6.** The inferred secondary cloverleaf structure for the tRNAs of *Spinolyprops cribricollis*.



**Figure S7.** The inferred secondary cloverleaf structure for the tRNAs of *Gonocephalum kochi*.



**Figure S8.** The inferred secondary cloverleaf structure for the tRNAs of *Morphostenophanes yunnanus*.



**Figure S9.** The inferred secondary cloverleaf structure for the tRNAs of *Crypsis chinensis*.



**Figure S10.** The ML tree of Tenebrionidae inferred based on 13 PCGs. The value on each branch shows posterior probability.