**Appendix 1**

List of taxa used in the analysis, including GenBank accession numbers and host information.

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| --- | --- | --- | --- | --- | --- |
| **Species** | **Family** | **Host** | **Accession number** | **Gen Region** | **Sequence****length** |
| *Nosopsyllus fasciatus* | Ceratophyllidae | *Apodemus sylvaticus* | LT158061 | 18S | 1,153 |
| *Nosopsyllus fasciatus* | Ceratophyllidae | Muridae | LT158062 | 18S | 1,153 |
| *Nosopsyllus barbarus* | Ceratophyllidae | *Rattus* sp. | LN881536 | 18S | 1,153 |
| *Paraceras crispum* | Ceratophyllidae | *Sciurotamius davidianus* | EU336075 | 18S | 1,866 |
| *Stenoponia americana* | Stenoponiidae | *Peromyscus leucopus* | AF423893 | 18S | 1,877 |
| *Stenoponia sidimi* | Stenoponiidae | *Clethrionomys rufocans* | EU336078 | 18S | 1,869 |
| *Stenoponia tripectinata tripectinata* | Stenoponiidae | *Mus musculus* | LK937066 | 18S | 1,095 |
| *Stenoponia tripectinata tripectinata* | Stenoponiidae | *Mus musculus* | LK937067 | 18S | 1,096 |
| *Stenoponia tripectinata tripectinata* | Stenoponiidae | *Mus musculus* | LK937068 | 18S | 1,098 |
| *Neopsylla bidentatiformis* | Ctenophthalmidae | *Cricetulus triton* | EU336074 | 18S | 1,862 |
| *Pulex irritans* | Pulicidae | *Speotyto cunicularia* | AF423915 | 18S | 1,879 |
| *Xenopsylla cheopis* | Pulicidae | *Rattus exulans* | EU336038 | 18S | 1,881 |
| *Xenopsylla robertsi* | Pulicidae | Unknown | KM891147 | 18S | 1,793 |
| *Xenopsylla cunicularis* | Pulicidae | *Oryctolagus cuniculus* | EU336098 | 18S | 1,869 |
| *Cediopsylla inaequalis inaequalis* | Pulicidae | *Vulpes macrotus* | EU336042 | 18S | 1,869 |
| *Archaeopsylla erinacei* | Pulicidae | Unknown | X89486 | 18S | 1,926 |
| *Hoplopsyllus anomalus* | Pulicidae | *Spermophilus variegatus* | EU336047 | 18S | 1,881 |
| *Hoplopsyllus anomalus* | Pulicidae | Unknown | AY521849 | 18S | 1,902 |
| *Spilopsyllus cuniculi* | Pulicidae | *Oryctolagus cuniculus* | EU336097 | 18S | 1,881 |
| *Spilopsyllus cuniculi* | Pulicidae | Mammal | JN008928 | 18S | 1,110 |
| *Echidnophaga gallinacea* | Pulicidae | *Urocyon cinereoargenteus* | EU336055 | 18S | 1,881 |
| *Echidnophaga iberica* | Pulicidae | *Oryctolagus cuniculus* | EU336099 | 18S | 1,882 |
| *Echidnophaga myrmecobii* | Pulicidae | Mammal | JN008929 | 18S | 1,118 |
| *Ctenocephalides felis* | Pulicidae | Unknown | KC177274 | 18S | 1,884 |
| *Ctenocephalides felis* | Pulicidae | *Canis lupus familiaris* | LN651166 | 18S | 989 |
| *Ctenocephalides canis* | Pulicidae | Unknown | AF423914 | 18S | 1,878 |
| *Ctenocephalides canis* | Pulicidae | *Canis lupus familiaris* | LN651167 | 18S | 989 |
| *Echidnophaga gallinacea* | Pulicidae | *Gallus gallus domesticus* | EU169199 | ITS1 | 1,105 |
| *Ctenocephalides canis* | Pulicidae | *Canis lupus familiaris* | HF563590 | ITS1 | 671 |
| *Ctenocephalides felis* | Pulicidae | *Canis lupus familiaris* | LN827902 | ITS1 | 668 |
| *Xenopsylla cheopis* | Pulicidae | Unknown | DQ295061 | ITS1 | 890 |
| *Xenopsylla cheopis* | Pulicidae | Unknown | DQ295060 | ITS1 | 890 |
| *Spilopsyllus cuniculi* | Pulicidae | *Felis silvestris catus* | EU170157 | ITS1 | 760 |
| *Pulex irritans* | Pulicidae | *Homo sapiens* | EU169198 | ITS1 | 929 |
| *Pulex irritans* | Pulicidae | *Homo sapiens* | GQ387496 | ITS1 | 948 |
| *Stenoponia tripectinata tripectinata* | Stenoponiidae | *Mus musculus* | LK937053 | ITS1 | 1,205 |
| *Stenoponia tripectinata tripectinata* | Stenoponiidae | *Mus musculus* | LK937057 | ITS1 | 1,207 |
| *Stenoponia tripectinata tripectinata* | Stenoponiidae | *Mus musculus* | LK937062 | ITS1 | 1,207 |
| *Tunga penetrans*  | Tungidae | *Canis lupus familiaris* | EU169194 | ITS1 | 877 |
| *Tunga penetrans*  | Tungidae | *Homo sapiens* | EU169197 | ITS1 | 1,075 |
| *Tunga penetrans*  | Tungidae | *Homo sapiens* | EU169196 | ITS1 | 867 |
| *Citellophilus tesquorum altaicus* | Ceratophyllidae | Unknown | EU770312 | ITS1 | 1,456 |
| *Citellophilus tesquorum dzetysuensis* | Ceratophyllidae | Unknown | EU770316 | ITS1 | 1,450 |
| *Nosopsyllus barbarus* | Ceratophyllidae | *Rattus* sp. | LN881538 | ITS1 | 1,100 |
| *Nosopsyllus barbarus* | Ceratophyllidae | *Rattus* sp. | LN881539 | ITS1 | 1,100 |
| *Nosopsyllus fasciatus* | Ceratophyllidae | *Apodemus sylvaticus* | LT158055 | ITS1 | 1,100 |
| *Nosopsyllus fasciatus* | Ceratophyllidae | *Crocidura russula* | LT158053 | ITS1 | 1,100 |
| *Anopheles moucheti nigerensis* | Culicidae | - | AM232662 | ITS1 | 648 |
| *Anopheles moucheti bervoetsi* | Culicidae | - | AM232663 | ITS1 | 629 |
| *Ophthalmopsylla kiritschenkoi* | Leptopsyllidae | Unknown | GQ161960 | ITS2 | 474 |
| *Ophthalmopsylla extrema* | Leptopsyllidae | Unknown | GQ161956 | ITS2 | 466 |
| *Amphipsylla quadratoides quadratoides* | Leptopsyllidae | Unknown | AY072642 | ITS2 | 497 |
| *Leptopsylla* sp. | Leptopsyllidae | Unknown | EF504221 | ITS2 | 459 |
| *Leptopsylla* sp. | Leptopsyllidae | Unknown | EF504223 | ITS2 | 449 |
| *Neopsylla siboi* | Ctenophthalmidae | Unknown | AF353113 | ITS2 | 479 |
| *Neopsylla teratura* | Ctenophthalmidae | Unknown | AF353122 | ITS2 | 479 |
| *Neopsylla stevensi* | Ctenophthalmidae | Unknown | AY337033 | ITS2 | 479 |
| *Neopsylla specialis* | Ctenophthalmidae | Unknown | AF353120 | ITS2 | 479 |
| *Xenopsylla cheopis* | Pulicidae | *Rattus* sp. | DQ295061 | ITS2 | 356 |
| *Xenopsylla cheopis* | Pulicidae | *Rattus* sp. | DQ295059 | ITS2 | 356 |
| *Ctenocephalides felis* | Pulicidae | *Canis lupus familiaris* | LN827903 | ITS2 | 327 |
| *Ctenocephalides canis* | Pulicidae | *Canis lupus familiaris* | LN827905 | ITS2 | 327 |
| *Ctenocephalides canis* | Pulicidae | *Canis lupus familiaris* | LN864485 | ITS2 | 327 |
| *Tunga penetrans* | Tungidae | *Homo sapiens* | DQ844716 | ITS2 | 471 |
| *Tunga penetrans* | Tungidae | *Homo sapiens* | DQ844724 | ITS2 | 473 |
| *Tunga trimamillata* | Tungidae | Unknown | AY425820 | ITS2 | 470 |
| *Stenoponia tripectinata tripectinata* | Stenoponiidae | *Mus musculus* | LK937042 | ITS2 | 332 |
| *Stenoponia tripectinata tripectinata* | Stenoponiidae | *Mus musculus* | LK937039 | ITS2 | 332 |
| *Stenoponia tripectinata tripectinata* | Stenoponiidae | *Mus musculus* | LK937038 | ITS2 | 332 |
| *Citellophilus tesquorum dzetysuensis* | Ceratophyllidae | Unknown | EU770316 | ITS2 | 332 |
| *Citellophilus tesquorum altaicus* | Ceratophyllidae | Unknown | EU770312 | ITS2 | 332 |
| *Nospsyllus fasciatus* | Ceratophyllidae | *Apodemus sylvaticus* | LT158059 | ITS2 | 318 |
| *Nosopsyllus fasciatus* | Ceratophyllidae | Muridae | LT158060 | ITS2 | 318 |
| *Nosopsyllus barbarus* | Ceratophyllidae | *Rattus* sp. | LN881537 | ITS2 | 318 |
| *Echidnophaga gallinacea* | Pulicidae | *Oryctolagus cuniculus* | JN008921 | *Cox1* | 650 |
| *Echidnophaga myrmecobii* | Pulicidae | *Oryctolagus cuniculus* | JN008919 | *Cox1* | 649 |
| *Echidnophaga iberica* | Pulicidae | *Oryctolagus cuniculus* | KF479239 | *Cox1* | 658 |
| *Echidnophaga* sp. | Pulicidae | Mammal | JN008922 | *Cox1* | 654 |
| *Echidnophaga ambulans ambulans* | Pulicidae | *Tachyglossus aculeatus* | KR363632 | *Cox1* | 601 |
| *Xenopsylla cunicularis* | Pulicidae | *Oryctolagus cuniculus* | KF479238 | *Cox1* | 658 |
| *Xenopsylla robertsi* | Pulicidae | Unknown | KM890906 | *Cox1* | 1,179 |
| *Xenopsylla conformis conformis* | Pulicidae | Unknown | KM890988 | *Cox1* | 1,218 |
| *Xenopsylla skrjabini* | Pulicidae | Unknown | KM890983 | *Cox1* | 1,218 |
| *Pulex irritans* | Pulicidae | *Meles meles* | KF479246 | *Cox1* | 658 |
| *Pulex irritans* | Pulicidae | *Meles meles* | KF479247 | *Cox1* | 658 |
| *Pulex* sp. | Pulicidae | Unknown | KM891015 | *Cox1* | 1,251 |
| *Spilopsyllus cuniculi* | Pulicidae | *Oryctolagus cuniculus* | KF479236 | *Cox1* | 658 |
| *Spilopsyllus cuniculi* | Pulicidae | *Oryctolagus cuniculus* | KF479237 | *Cox1* | 658 |
| *Spilopsyllus cuniculi* | Pulicidae | Mammal | JN008918 | *Cox1* | 652 |
| *Synopsyllus girardi* | Pulicidae | Unknown | KM890952 | *Cox1* |  |
| *Ctenocephalides felis* | Pulicidae | *Canis lupus familiaris* | LN827896 | *Cox1* | 600 |
| *Ctenocephalides felis* | Pulicidae | Mammal | JN008917 | *Cox1* | 652 |
| *Ctenocephalides felis felis* | Pulicidae | *Felis catus* | KF684891 | *Cox1* | 601 |
| *Ctenocephalides felis felis* | Pulicidae | *Canis lupus familiaris* | KP684196 | *Cox1* | 601 |
| *Ctenocephalides felis strongylus* | Pulicidae | *Canis lupus familiaris* | KF684876 | *Cox1* | 601 |
| *Ctenocephalides orientis* | Pulicidae | *Canis lupus familiaris* | KF684871 | *Cox1* | 601 |
| *Ctenocephalides canis* | Pulicidae | *Canis lupus familiaris* | KP684210 | *Cox1* | 658 |
| *Ctenocephalides canis* | Pulicidae | *Canis lupus familiaris* | LN827901 | *Cox1* | 600 |
| *Neopsylla paranoma* | Ctenophthalmidae | *Eospalax baileyi* | KJ471028 | *Cox1* | 1,532 |
| *Paraceras melis melis* | Ctenophthalmidae | *Meles meles* | KF479245 | *Cox1* | 658 |
| *Neopsylla sellaris* | Ctenophthalmidae | *Eospalax baileyi* | KJ471029 | *Cox1* | 1,532 |
| *Stenoponia tripectinata tripectinata* | Stenoponiidae | *Mus musculus* | LK937072 | *Cox1* | 677 |
| *Stenoponia tripectinata tripectinata* | Stenoponiidae | *Mus musculus* | LK937071 | *Cox1* | 677 |
| *Stenoponia tripectinata tripectinata* | Stenoponiidae | *Mus musculus* | LK937073 | *Cox1* | 677 |
| *Stenoponia tripectinata tripectinata* | Stenoponiidae | *Apodemus sylvaticus* | KF479244 | *Cox1* | 658 |
| *Nosopsyllus fasciatus* | Ceratophyllidae | *Crocidura russula* | LT158040 | *Cox1* | 658 |
| *Nosopsyllus fasciatus* | Ceratophyllidae | *Apodemus sylvaticus* | LT158041 | *Cox1* | 658 |
| *Nosopsyllus barbarus* | Ceratophyllidae | *Rattus* sp | LN881549 | *Cox1* | 658 |
| *Nosopsyllus barbarus* | Ceratophyllidae | *Rattus* sp | LN881550 | *Cox1* | 658 |
| *Stenoponia tripectinata tripectinata* | Stenoponiidae | *Mus musculus* | LN897473 | *Cytb* | 374 |
| *Ophthalmopsylla praefecta praefecta* | Leptopsyllidae | Unknown | KM890714 | *Cytb* | 369 |
| *Ctenocephalides felis* | Pulicidae | *Canis lupus familiaris* | LN897470 | *Cytb* | 374 |
| *Ctenocephalides felis felis* | Pulicidae | Unknown | KM890759 | *Cytb* | 369 |
| *Ctenocephalides canis* | Pulicidae | *Canis lupus familiaris* | LN897471 | *Cytb* | 374 |
| *Ctenocephalides felis damarensis* | Pulicidae | Unknown | KM890641 | *Cytb* | 369 |
| *Archaeopsylla erinacei erinacei* | Pulicidae | Unknown | KM890725 | *Cytb* | 369 |
| *Synopsyllus girardi* | Pulicidae | Unknown | KM890686 | *Cytb* | 369 |
| *Xenopsylla conformis conformis* | Pulicidae | Unknown | KM890723 | *Cytb* | 369 |
| *Xenopsylla skjrabini* | Pulicidae | Unknown | KM890718 | *Cytb* | 369 |
| *Xenopsylla ramesis* | Pulicidae | Unknown | KM890637 | *Cytb* | 342 |
| *Echidnophaga oschanini* | Pulicidae | Unknown | KM890719 | *Cytb* | 369 |
| *Spilopsyllus cuniculi* | Pulicidae | Unknown | KM890622 | *Cytb* | 369 |
| *Cediopsylla inaequalis inaequalis* | Pulicidae | Unknown | KM890600 | *Cytb* | 369 |
|  | Pulicidae | Unknown |  | *Cytb* |  |
| *Nosopsyllus barbarus* | Ceratophyllidae | *Rattus* sp | LN897460 | *Cytb* | 374 |
| *Nosopsyllus barbarus* | Ceratophyllidae | *Rattus* sp | LN897462 | *Cytb* | 374 |
| *Nosopsyllus fasciatus* | Ceratophyllidae | Muridae | LT158049 | *Cytb* | 374 |
| *Nosopsyllus fasciatus* | Ceratophyllidae | *Apodemus sylvaticus* | LT158043 | *Cytb* | 374 |
| *Nosopsyllus iranis theodori* | Ceratophyllidae | *Gerbillus dasyurus* | KM890603 | *Cytb* | 369 |
| *Nosopsyllus laeviceps ellobii* | Ceratophyllidae | Unknown | KM890720 | *Cytb* | 369 |