

## Supplementary Materials

### Supplementary Text

Specimens Examined

N=469

Material studied: sn=skin, sl=skull, d=dental, p=penis

*Aeretes melanopterus*: AMNH45328 (sn,sl, d), 56933 (sn,sl, d). USNM219206 (sn, sl,d), 219205 (sn, sl, d). MNHNZM-MO-1874-551 (sl, d), ZM-MO-1867-554 (sn).

*Aeromys tephromelas*: FMNH90437 (sl, d). USNM291285 (sn, sl, d), 292649 (sn, sl, d), 292650 (sn, sl, d), 481192 (sn, sl, d). BMNH71.2736 (sn), 73.7.3.1 (sn, sl,d), 61.1166 (sl, d).

*Aeromys thomasi*: FMNH108895 (sl, d), 108896 (sl, d). USNM317237 (sn, sl, d).

*Belomys pearsonii*: AMNH87419 (sn,sl, d), 114889 (sn,sl, d), 167889 (sn,sl, d), 167890 (sl, d), 174853 (sl, d). FMNH35443 (sl, d), 76385 (sl, d). USNM257845 (sn, sl, d), 308160 (sn, sl, d), 358354 (sn, sl, d), 358355 (sn, sl, d), 358356 (sn, sl, d), 258345 (p). BMNH15.5.5.43 (sn, sl, d), 79.11.21.381 (sl, d), 85.8.1.136 (sl, d). KIZ034940 (sn, sl, d), 0305143 (sn, sl, d).

*Biswamoyopterus biswasi*: ZSI20705 (sn, sl, d).

*Biswamoyopterus gaoligongensis*: KIZ035622 (sn, sl, d), 034924 (sn, sl, d, p).

*Biswamoyopterus laoensis*: NUoLFES.MM.12.163 (sn, sl, d).

*Eoglaucmys fimbriatus*: USNM173361 (sn, sl, d), 173367 (sn, sl, d), 353239 (sn, sl, d), 353241 (sn, sl, d), 353243 (sn, sl, d), 410953 (sn, sl, d), 429353 (p). BMNH7.8.1.2 (sn, sl, d).

*Eupetaurus cinereus*: BMNH88.9.28.1 (sn), 17.4.8.1 (sn), 14.2.10.1 (sn), 20.1.17.6 (sn). ZSI9492 (sn, sl, d).

*Eupetaurus tibetensis*: ZSI19103 (sn). BMNH88.9.29.1 (sn), 23.11.10.2 (sn). NML19524 (sn, sl, d).

*Eupetaurus nivamons*: KIZ034192 (sn, sl, d), 034189 (sn, sl, d), 034190 (sn, sl, d), 035087 (sn, sl, d, p), 035088 (sn, sl, d).

*Glaucmys sabrinus*: AMNH95193 (p), USNM129708 (sn, sl, d), 140192 (sn, sl, d), 235940 (sn, sl, d), 19909 (sn, sl, d), 24271 (sn, sl, d), 68753 (sn, sl, d), 83152 (sn, sl, d), 87310 (sn, sl, d), 94310 (sn, sl, d), 136137 (sn, sl, d), 256993 (sn, sl, d), 260420 (sn, sl, d), 292278 (sn, sl, d). BMNH7.7.7.3994 (sn, sl, d).

*Glaucmys volans*: AMNH188251 (p). USNM64682 (sl, d), 252203 (sn, sl, d), 364560 (sn, sl, d), 132833 (sn, sl, d), 136400 (sn, sl, d), 261694 (sn, sl, d), 261695 (sn, sl, d), 329704 (sn, sl, d).

*Glaucmys oregonensis*: USNM141952 (sn, sl, d), 264921 (sn, sl, d), 561687 (sn, sl, d).

*Hylopetes alboniger*: AMNH114884 (sl, d), 114885 (sl, d), 114886 (sl, d). FMNH76379 (sn, sl, d), 76381 (sn, sl, d), 76382 (sn, sl, d), 40996 (sn, sl, d), 37889 (sn, sl, d), 76374 (sn, sl, d), 76377 (sn, sl, d), 76378 (sn, sl, d), 76384 (sn, sl, d), 105547 (sn, sl, d), 105548 (sn, sl, d), 76383 (sn, sl, d), 82841 (sn, sl, d), 32313 (sn, sl, d), 82842 (sn, sl, d). USNM37875 (sl, d), 20887 (sn, sl, d), 253608 (sn, sl, d), 253609 (sn, sl, d). KIZ034950 (sn, sl, d), 034970 (sn, sl, d), 031849 (sn, sl, d), 033840 (sn, sl, d), 034945 (sn, sl, d), 019675 (sn, sl, d), 034946 (sn, sl, d), 0305016 (sn, sl, d), 034949 (sn, sl, d),

034942 (sn, sl, d), 032543 (p).

*Hylopetes bartelsi*: USNM501690 (sl, d).

*Hylopetes nigripes*: AMNH203309 (sl, d). USNM477994 (sn, sl, d), 477995 (sn, sl, d), 477998 (sn, sl, d), 478009 (sn, sl, d). FMNH63031 (sn).

*Hylopetes phayrei*: AMNH163556 (sl, d), 163558 (sl, d), 163561 (sl, d), 163562 (sl, d), 167891 (sl, d), 167892 (sl, d), 167893 (sl, d), 58161 (sl, d), 58171 (sl, d), 58179 (sl, d). FMNH25588 (sn, sl, d), 25589 (sn, sl, d), 82836 (sn, sl, d), 82837 (sn, sl, d), 1074 (sn). USNM235580 (sn, sl, d), 259761 (sn, sl, d), 260623 (sn, sl, d), 260624 (sn, sl, d), 294889 (sn, sl, d), 294894 (sn, sl, d), 297086 (sl, d), 297089 (sn, sl, d), 355126 (sn, sl, d), 584420 (sn, sl, d).

*Hylopetes platyurus*: AMNH101834 (sl, d), 101837 (sl, d), 101839 (sl, d), 101431 (sl, d), 101711 (sl, d), 106641 (sl, d), 106737 (sl, d), 101440 (sl, d), 101442 (sl, d), USNM488618 (sn, sl, d), 488619 (sn, sl, d), 488626 (sn, sl, d), 488627 (sn, sl, d).

*Hylopetes sagitta*: FMNH82834 (sn, sl, d), 88340 (sn, sl, d). USNM301023 (sn, sl, d).

*Hylopetes sipora*: BMNH47.1475 (sn).

*Hylopetes spadiceus*: AMNH54822 (sn, sl, d), FMNH37886 (sn, sl, d), 37888 (sn, sl, d), 46646 (sn, sl, d), 46644 (sn). USNM104627 (sn, sl, d), 123931 (sn, sl, d), 123933 (sn, sl, d), 292651 (sn, sl, d), 292652 (sn, sl, d), 308155 (sn, sl, d), 357017 (sn, sl, d), 481109 (sn, sl, d), 481115 (sn, sl, d), 535203 (sn, sl, d), 122883 (sn, sl, d). BMNH94.9.28.42 (sn, sl, d).

*Iomys horsfieldii*: AMNH185169 (sl, d, p), 185170 (sl, d). FMNH10889 (sn, sl, d), 108900 (sn, sl, d). USNM151792 (sn, sl, d), 292653 (sn, sl, d), 292654 (sl, d), 317240 (sn, sl, d), 153684 (sn, sl, d), 301024 (sn). BMNH55.12.24.102 (sn, sl, d), 47.1474 (sn, sl, d).

*Iomys sipora*: AMNH103151 (sn, sl, d), 103313 (sn, sl, d). USNM252321 (sn, sl, d). BMNH47.1473 (sn).

*Petaurillus hosei*: BMNH99.12.9.85 (sn, sl, d).

*Petaurillus kinlochii*: USNM488708 (sn, sl, d), 488709 (sn, sl, d), 488710 (sn, sl, d), 488711 (sn, sl, d).

*Petaurista albiventer*: AMNH83441 (sn, sl, d), 163570 (sn, sl, d), 163573 (sn, sl, d), 32643 (sn, sl, d), 55837 (sn, sl, d). USNM257713 (sn, sl, d), 297078 (sn, sl, d), 297080 (sn, sl, d), 297082 (sn, sl, d), 174079 (sn, sl, d), 353202 (sn, sl, d), 410952 (sn, sl, d), 35495 (sn, sl, d), 37877 (sl, d). BMNH114c (sn, sl, d), 5.11.19.3 (sn, sl, d), 85.8.1.121 (sn, sl, d). MNHNZM-MO-2000-608 (sn, sl, d).

*Petaurista alborufus*: MNHNZN-MO-1870-42 (sn, sl, d). BMNH10.10.19.4 (sn, sl, d), 14.12.1.5 (sn), 95.7.4.1 (sn, sl, d), 23.4.1.93 (sn).

*Petaurista caniceps*: AMNH163577 (sl, d). BMNH22.9.1.44 (sn, sl, d), 1937.6.14.1 (sn, sl, d), 558a (sn, sl, d), 79.11.21.531 (sn, sl, d), 47.1472 (sn, sl, d). KIZ034932 (sn, sl, d), 034962 (sn, sl, d), 034931 (sn, sl, d), 034933 (sn, sl, d), 034963 (sn, sl, d).

*Petaurista elegans*: AMNH101780 (sl, d), 101781 (sn, sl, d), 102468 (sl, d), 163578 (sl, d), 57372 (sl, d). USNM84422 (sn, sl, d), 292647 (sn, sl, d), 292648 (sn, sl, d), 300107 (sn, sl, d), 307574 (sn, sl, d), 240857 (sn). BMNH12.7.25.33 (sn, sl, d), 46.3.4.8 (sn, sl, d), 16.3.26.14 (sn, sl, d), 47.1471 (sn). KIZ034937 (sn, sl, d), 034938 (sn, sl, d), 034972 (sn, sl, d), 034973 (sn, sl, d), 034939 (sn, sl, d).

*Petaurista hainana*: AMNH58201 (sl, d), 58209 (sl, d), 58210 (sl, d), 58211 (sl, d), 58212 (sn, sl, d),

58213 (sn, sl, d), 58214 (sl, d), 58200 (sl, d).

*Petaurista lena*: AMNH183145 (sl, d), 184534 (sl, d), 184916 (sl, d), 184918 (sl, d). BMNH8.4.1.39 (sn, sl, d).

*Petaurista leucogenys*: USNM1470879 (sl, d), 149880 (sl, d), 140881 (sl, d). BMNH5.3.3.17 (sn, sl, d), 5.1.4.50 (sn, sl, d), 3.5.18.1 (sn, sl, d), 80.3.30.3 (sl, d), 23.3.8.2 (sn).

*Petaurista magnificus*: USNM290079 (sl, d), BMNH43.1.12.47 (sn, sl, d) .

*Petaurista nobilis*: FMNH105543 (sn, sl, d), 105544 (sn, sl, d), 105545 (sn, sl, d), 105546 (sn, sl, d), 114365 (sn, sl, d), 114643 (sn, sl, d), 112560 (sn, sl, d), 114364 (sn, sl, d), 114366 (sn, sl, d), 114367 (sn, sl, d). BMNH79.11.21.529 (sn, sl, d).

*Petaurista petaurista petaurista*: USNM121499 (sn, sl, d), 121500 (sn, sl, d), 156386 (sn, sl, d).

*Petaurista petaurista batuana*: USNM121742 (sn, sl, d).

*Petaurista petaurista cicur*: BMNH49.431 (sn, sl, d).

*Petaurista petaurista grandis*: AMNH184922 (sl, d), 184924 (sl, d), 184927 (sl, d), 184929 (sl, d), BMNH62.12.24.10 (sl, d), 62.12.24.9 (sn, sl, d).

*Petaurista petaurista marchio*: USNM143341 (sn, sl, d). BMNH0.8.2.24 (sn, sl, d).

*Petaurista petaurista melanotus*: BMNH116a (sn, sl, d).

*Petaurista petaurista nigrescens*: USNM19177 (sn, sl, d).

*Petaurista petaurista nigricaudatus*: BMNH49.432 (sn, sl, d).

*Petaurista petaurista nitidula*: BMNH94.9.28.10 (sn, sl, d).

*Petaurista petaurista penangensis*: BMNH49.433 (sn, sl, d).

*Petaurista petaurista rajah*: BMNH99.12.9.31 (sn, sl, d).

*Petaurista petaurista stellaris*: BMNH47.1470 (sn, sl, d).

*Petaurista petaurista terutaus*: USNM123934 (sn, sl, d).

*Petaurista philippensis annamensis*: BMNH79b (sn).

*Petaurista philippensis cineraceus*: MNHN1960-3676 (sn), 1962-2174 (sn).

*Petaurista philippensis lylei*: MNHNZM-MO-1948-373 (sn). KIZ019674 (sn, sl, d).

*Petaurista philippensis miloni*: MNHN1982-843 (sn).

*Petaurista philippensis*: AMNH87417 (sl, d), 87418 (sl, d), 55836 (sl, d). FMNH82830 (sl, d), 82831 (sl, d), 96323 (sl, d), 98266 (sl, d), 99406 (sl, d), 99407 (sl, d), 82828 (sl, d), 82829 (sl, d).

BMNH6.11.6.14 (sn, sl, d), 25.1.1.42 (sn, sl, d), 98.10.5.41 (sn, sl, d), 14.4.3.1 (sn, sl, d), 22.8.21.1 (sn, sl, d), 23.1.6.53 (sn, sl, d), 23.1.6.50 (sn, sl, d), 115b (sn, sl, d), 115d (sn, sl, d), 96.11.7.5 (sn, sl, d), 198a (sn, sl, d), 96.3.27.1 (sn, sl, d).

*Petaurista xanthotis*: AMNH85063 (sl, d). FMNH34208 (sl, d). USNM144021 (sn, sl, d), 255136 (sn, sl, d). BMNH23.4.1.29 (sl, d), 27.6.24.1 (sn), 23.4.1.27 (sn).

*Petaurista yunanensis*: MNHN1896-2069 (sn). KIZ034928 (sn, sl, d), 034930 (sn, sl, d), 034927 (sn, sl, d), 034966 (sn, sl, d), 034964 (sn, sl, d), 034967 (sn, sl, d), 034926 (sn, sl, d), 034925 (sn, sl, d), 034923 (sn, sl, d), 034929 (sn, sl, d), 031250 (p).

*Petinomys crinitus*: FMNH87439 (sn, sl, d), 92787 (sn, sl, d). USNM239217 (sn, sl, d).

*Petinomys fuscocapillus*: AMNH150063 (sn,sl, d), 240844 (sn,sl, d), 240845 (sl, d). BMNH52.5.9.19 (sn).

*Petinomys genibarbis*: USNM3930 (sn, sl, d), 488671 (sn, sl, d), 488672 (sn, sl, d). BMNH60.5.4.83 (sn), 99.12.9.35 (sn).

*Petinomys hageni*: FMNH47126 (sn, sl, d). USNM143344 (sn, sl, d), 143345 (sn, sl, d).

*Petinomys lugens*: AMNH103149 (sl, d), 103318 (sn, sl, d). USNM252319 (sn, sl, d), 252320 (sn, sl, d), 121531 (sn, sl, d), BMNH95.1.9.7 (sn, sl, d).

*Petinomys mindanensis*: AMNH207540 (sl, d), 207541 (sn, sl, d). USNM254651 (sn, sl, d), 267975 (sn, sl, d).

*Petinomys setosus*: AMNH113031 (sl, d). FMNH89461 (sn, sl, d). USNM301022 (sn, sl, d), 481132 (sn, sl, d), 481140 (sn, sl, d), 481141 (sn, sl, d), 535204 (sn, sl, d).

*Petinomys vordermanni*: USNM124986 (sn, sl, d), 481153 (sn, sl, d), 481168 (sn, sl, d), 481173 (sn, sl, d). BMNH14.12.8.243 (sn).

*Priapomys leonardi*: KIZ034951 (sn, sl, d), 034952 (sn, sl, d), 034953 (sn, sl, d), 034954 (sn, sl, d), 034971 (sn, sl, d), 0410099 (sn, sl, d), 035090 (p). BMNH20.8.8.2 (sn, sl, d). DUE110001 (sn), E110002 (sn), E110003 (sn), E110005 (sn), E110006 (sn), E110007 (sn).

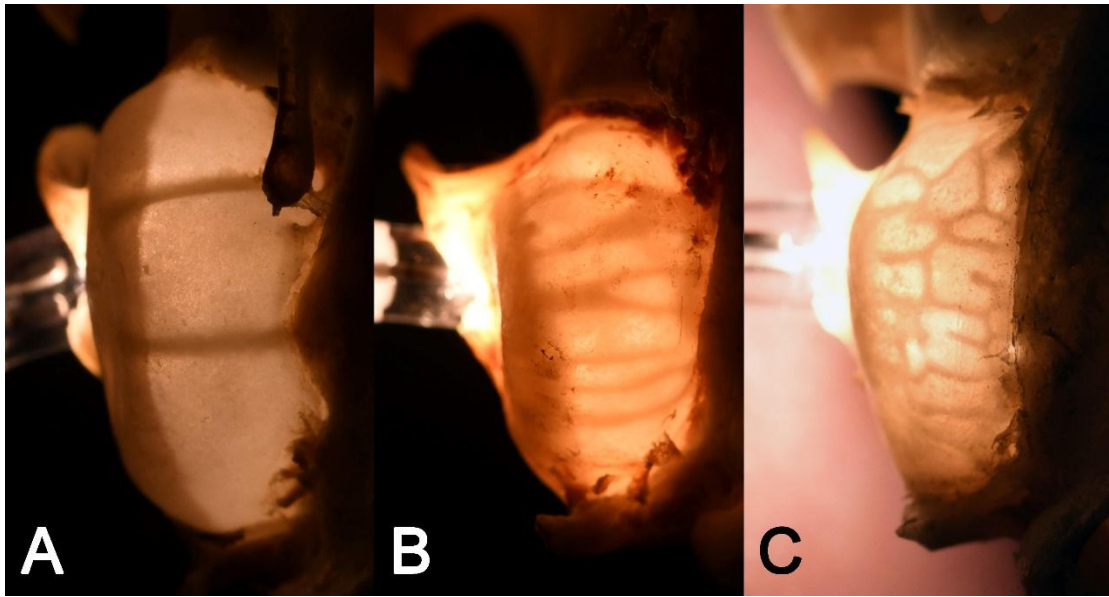
*Pteromys momonga*: USNM38075 (sn, sl, d). BMNH6.1.4.122 (sn), 6.1.4.125 (sl, d).

*Pteromys volans*: AMNH19526 (sl, d), 19534 (sl, d), 85466 (sl, d), 85487 (sl, d), 178821 (sl, d). FMNH92938 (sn, sl, d). USNM172624 (sn, sl, d), 172625 (sn, sl, d), 172626 (sn, sl, d), 270545 (sn, sl, d), 237587 (sl, d), 237588 (sl, d), 254934 (sn, sl, d), 200613 (sn, sl, d). BMNH1937.6.12.1 (sn), 20.7.4.21 (sl, d). KIZ022998 (p).

*Pteromyscus pulverulentus*: AMNH217576 (p). USNM481184 (sn, sl, d), 481186 (sn, sl, d), 489512 (sn, sl, d), 489514 (sn, sl, d). BMNH28.7.14.2 (sl, d), 91.8.28.10 (sn, sl, d), 71.1534 (sn, sl, d), 73.7.3.2 (sn).

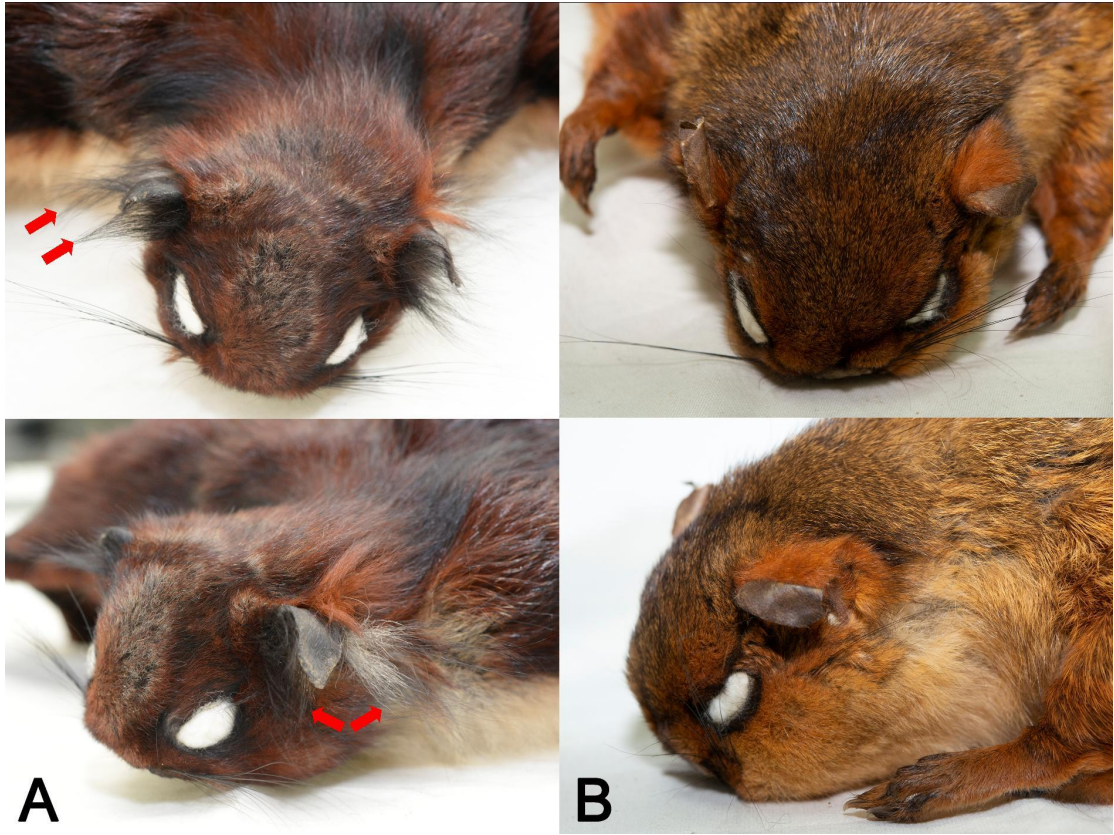
*Trogopterus xanthipes*: FMNH39834 (sn, sl, d), 39835 (sn, sl, d). USNM241271 (sn, sl, d), 254807 (sn, sl, d), 258520 (sn, sl, d), 258980 (sn, sl, d), 268872 (sn, sl, d). BMNH48.309 (sn, sl, d), 23.4.1.32 (sl, d), 14.6.24.1 (sl, d), 9.7.21.4 (sl, d), 95.7.5.1 (sl, d). MNHNZM-MO-1867-555 (sn, sl, d), ZM-MO-1867-556 (sn, sl, d). KIZ034969 (sn, sl, d), 034956 (sn, sl, d), 034957 (sn, sl, d, p), 034958 (sn, sl, d), 034959 (sn, sl, d), 022612 (sn, sl, d), 034968 (sn, sl, d), 028831 (sn, sl, d), 034960 (sn, sl, d).

Supplementary Figure S1



Bulla septae of A) Common form, septae $<$ 4 (*Aeretes*, *Aeromys*, *Eoglaucomys*, *Eupetaurus*, *Glaucomys*, *Hylopetes*, *Iomys*, *Petaurillus*, *Petaurista*, *Pteromys*, *Pteromys* (*Hylopetes*) *leonardi* (= *Priapomys* gen. nov.)); B) honeycomb form, septae $>$ 4, not crossing each other (*Belomys*, *Biswamoyopterus*, *Trogopterus*, *Pteromyscus*, *Petinomys setosus*); and C) cobweb form, septae $>$ 4, crossing each other (*Petinomys* excluding *Petinomys setosus*).

Supplementary Figure S2

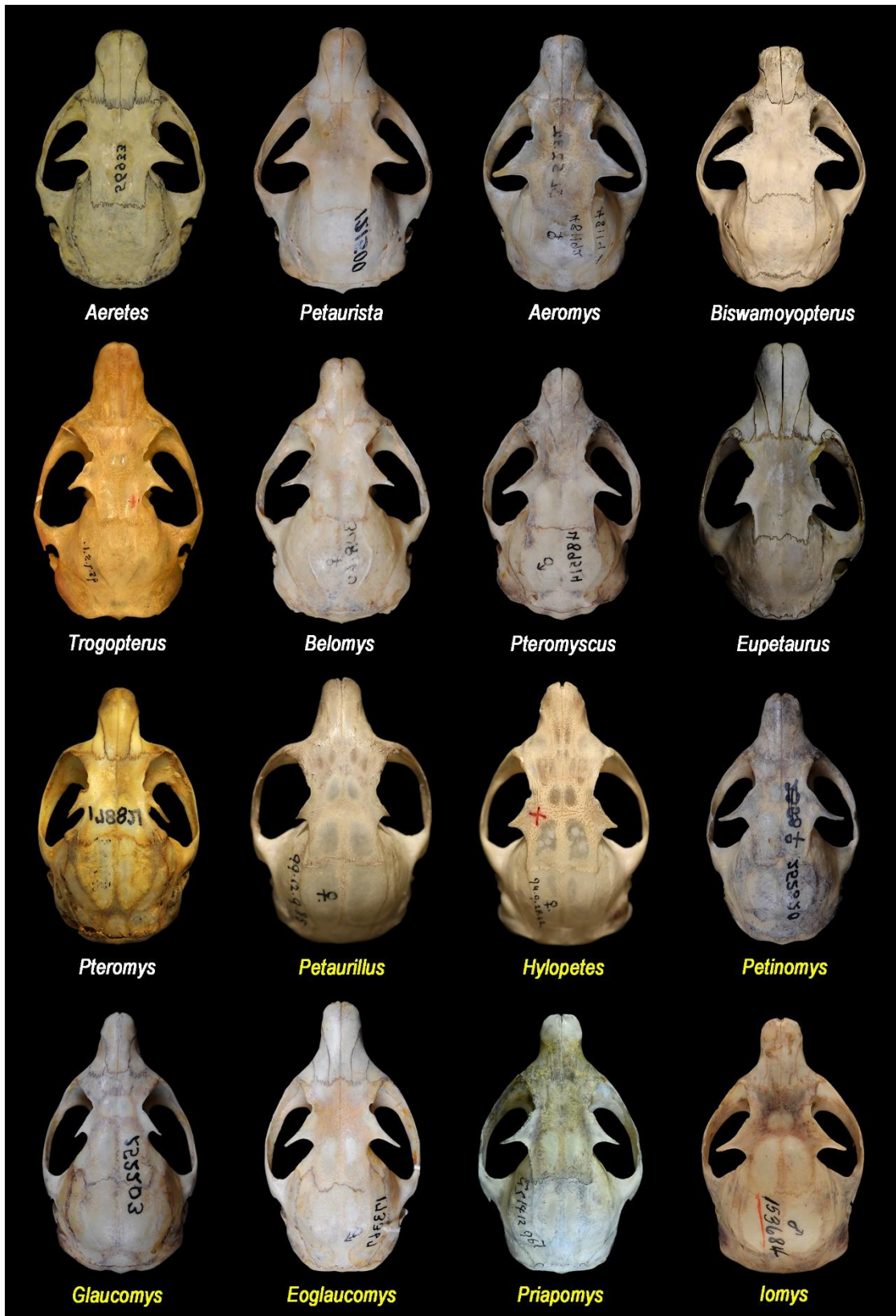


**A**  
Ear tufts, A. present (red arrow), B. absent.

**B**

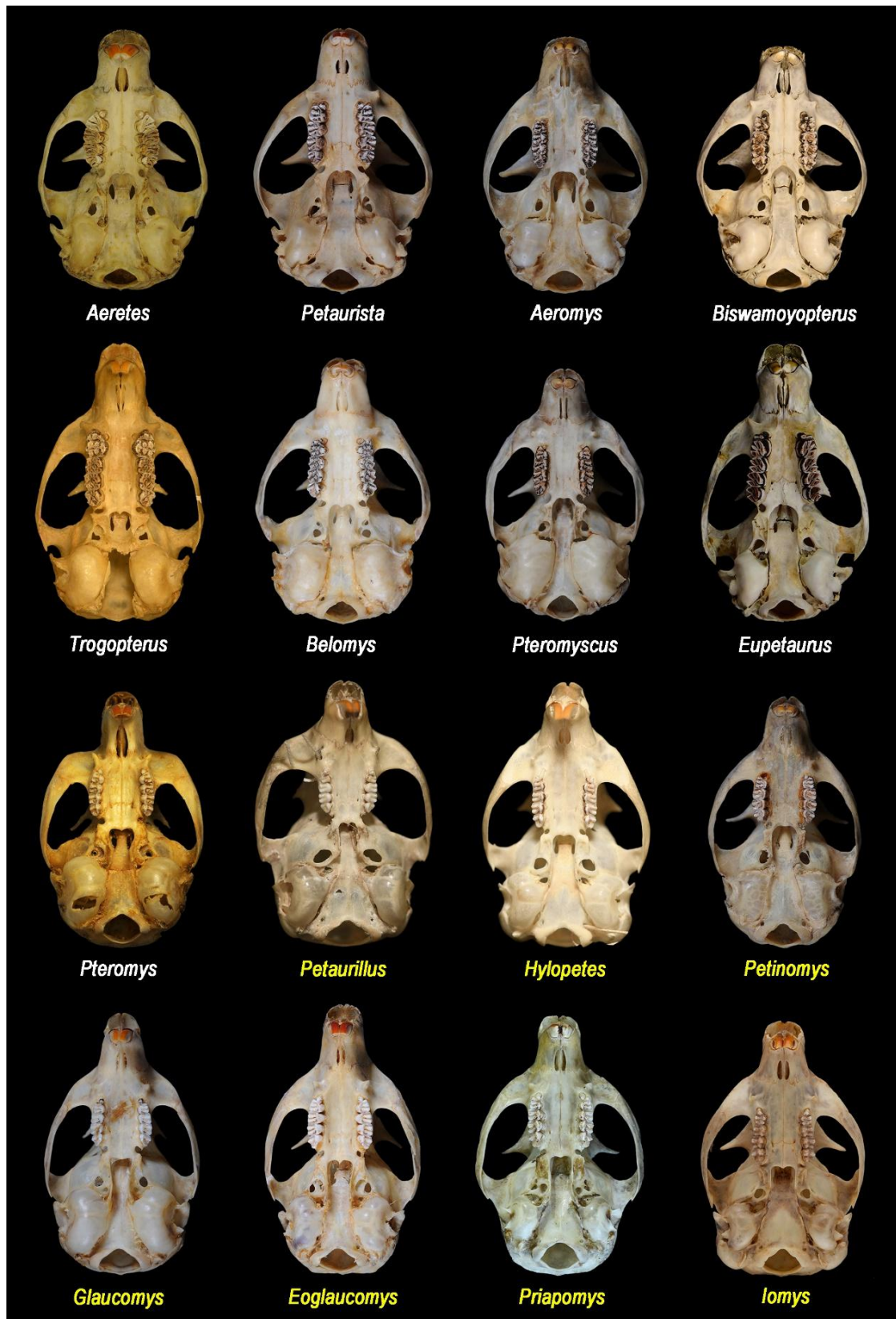


Supplementary Figure S3A



Dorsal view of skulls of sixteen extant flying squirrel genera, scaled to similar length. Refer to the legend of Supplementary Figure S3C for the detailed information of the specimens.

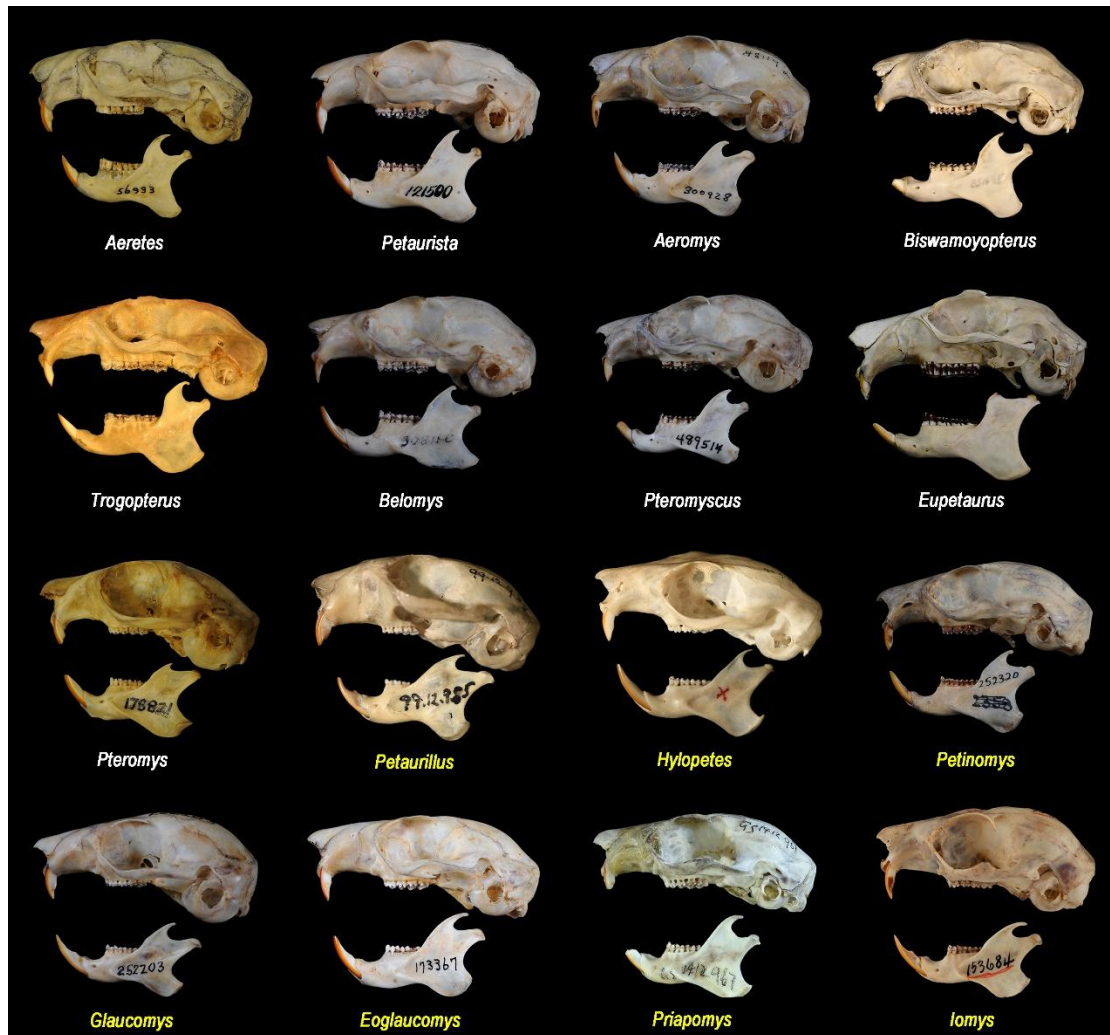
Supplementary Figure S3B



Bottom view of skulls of sixteen extant flying squirrel genera, scaled to similar length. Refer to the legend of Supplementary Figure S3C for the detailed information of the specimens.



Supplementary Figure S3C

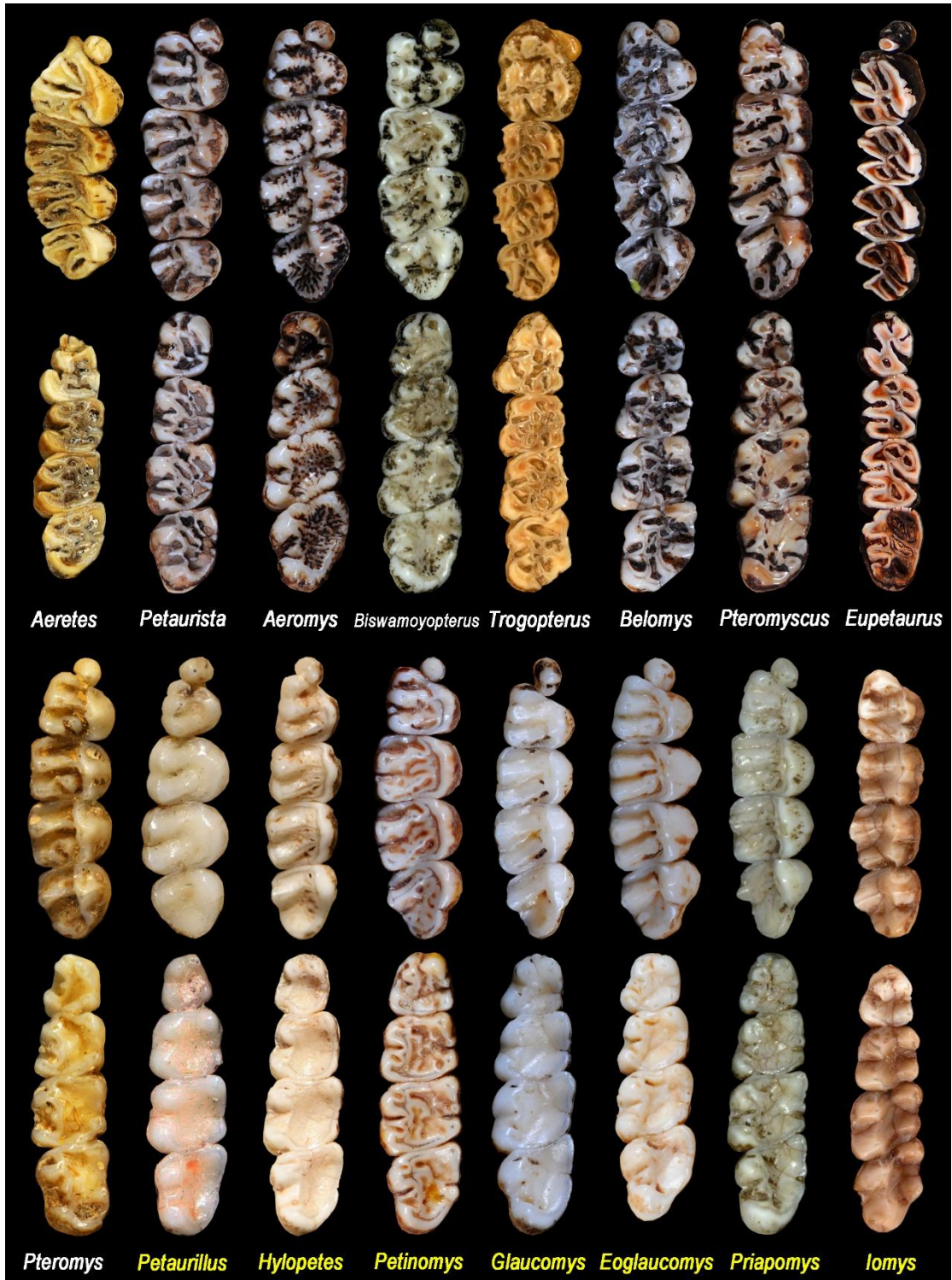


Lateral view of skulls and mandibles of sixteen extant flying squirrel genera, scaled to similar length.

**Detailed information of the specimens in Supplementary Figure S3ABCD:**

*Aeretes*: *Aeretes melanopterus* (AMNH56933), *Petaurista*: *Petaurista petaurista* (USNM121500), *Aeromys*: *Aeromys tephromelas* (USNM481192), *Biswamoyopterus*: *Biswamoyopterus gaoligongensis* (KIZ034924), *Trogopterus*: *Trogopterus xanthipes* (BMNH95.7.5.1), *Belomys*: *Belomys pearsonii* (USNM308160), *Pteromyscus*: *Pteromyscus pulverulentus* (USNM489514), *Eupetaurus*: *Eupetaurus nivamons* (KIZ034190), *Pteromys*: *Pteromys volans* (AMNH178821), *Petaurillus*: *Petaurillus hosei* (BMNH99.12.9.85), *Hylopetes*: *Hylopetes spadiceus* (BMNH94.9.28.42), *Petinomys*: *Petinomys lugens* (USNM252320), *Glaucomys*: *Glaucomys volans* (USNM252203), *Eoglaucomys*: *Eoglaucomys fimbriatus* (USNM173367), *Priapomys*: *Pteromys* (*Hylopetes*) *leonardi* (= *Priapomys leonardi*) (KIZ034951), and *Iomys*: *Iomys horsfieldii* (USNM153684). White letters indicate members of Pteromyina, yellow indicate Glaucomyina.

Supplementary Figure S3D



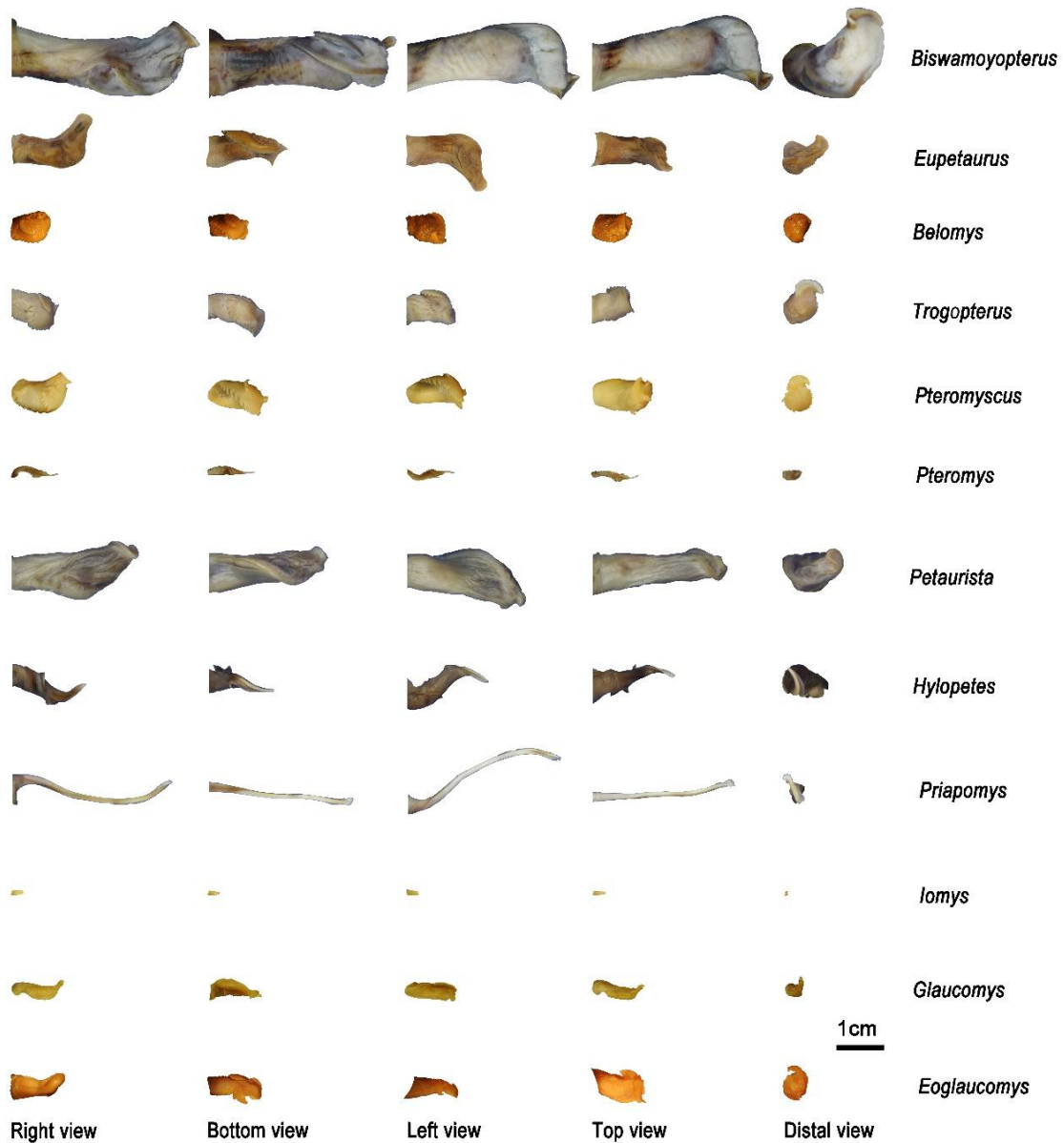
Upper cheek teeth (1<sup>st</sup> & 3<sup>rd</sup> row) and lower cheek teeth (2<sup>nd</sup> & 4<sup>th</sup> row) of sixteen extant flying squirrel genera, scaled to similar length. Refer to the legend of Supplementary Figure S3C for the detailed information of the specimens. For all teeth, the left side is buccal side.

**Supplementary Figure S4**



Buccal view of the upper cheekteeth of *Pteromys (Hylopetes) leonardi* (= *Priapomys leonardi*) (left, three cusps, BMNH20.8.8.2), *Hylopetes alboniger* (middle, four cusps, FMNH76377), and *Petinomys lugens* (right, four cusps, USNM252319).

Supplementary Figure S5



Glans penis of some extant flying squirrel genera:

*Biswamoyopterus*: *Biswamoyopterus gaoligongensis* (KIZ034924, Body mass=1 370 g),  
*Eupetaurus*: *Eupetaurus nivamons* (KIZ035087, Body mass=1 555 g), *Belomys*: *Belomys pearsonii* (USNM258345, Body mass=156 g\*), *Trogopterus*: *Trogopterus xanthipes* (KIZ034957, Body mass=600 g), *Pteromyscus*: *Pteromyscus pulverulentus* (AMNH217576, Body mass=122g), *Pteromys*: *Pteromys volans* (KIZ022998, Body mass=138 g\*), *Petaurista*: *Petaurista yunanensis* (KIZ031250, Body mass=2 120 g), *Hylopetes*: *Hylopetes alboniger* (KIZ032543, Body mass=251 g), *Priapomys*: *Pteromys (Hylopetes) leonardi* (= *Priapomys leonardi*) (KIZ035090, Body mass=209 g), *Iomys*: *Iomys horsfieldii* (broken, AMNH185169, Body mass=165 g\*), *Glaucomys*: *Glaucomys sabrinus* (AMNH95193, Body mass=142 g\*), and *Eoglaucomys*: *Eoglaucomys fimbriatus* (USNM429353, Body mass=734 g\*). The asterisk indicates that the body mass data comes from the summary of Thorington *et al.* (2012) rather than from the specimen itself. Scale bar shown.







**Supplementary Table S1**

Terms of dental morphology used in this paper with notes on the equivalents by different authors

| position            | Terms used in this paper |  | Equivalents  |
|---------------------|--------------------------|--|--|
|                     | Terms                    | Abbrev   |  |
| Upper<br>cheekteeth | paracone                 | pa   |  |
|                     | metacone                 | me   |  |
|                     | protocone                | pr   |  |
|                     | hypocone                 | hy   |  |
|                     | parastyle                | past   |  |
|                     | mesostyle                | msst   |  |
|                     | paraconule               | pacu   | protoconule (Qiu <i>et al</i> 2019, Tong 2007)   |
|                     | metaconule               | mecu   |  |
|                     | anteroloph               | anl  | anterior cingulum (James, 1963)  |
|                     | paraloph                 | pal  | protoloph (Qiu <i>et al</i> 2019, McKenna 1962), anterior transverse ridge (Allen, 1940) , postparaconule crista + preprotocrista (Zhou <i>et al</i> 1975) |
|                     | metaloph                 | mel  | posterior transverse ridge (Allen, 1940), premetaconule crista + postprotocrista (Zhou <i>et al</i> 1975)  |
|                     | posteroloph              | pol  | posterior cingulum (James, 1963)   |
|                     | endoloph                 | enl  |  |
|                     | anterolophule            | anlu   |  |
|                     | mesolophule              | mslu   | protolophule (Qiu <i>et al</i> 2019)   |
|                     | preparaconule crista     | prepalc  |  |
|                     | postmetaconule crista    | pomelc   |  |
|                     | anterior valley          | av   | anterofossette (Tong 2007), paraflexus+anterofossette (McKenna 1962), paraflexus (Kawamura 1988)   |
|                     | central valley           | cv   | medifossette (Tong, 2007), posterobuccal flexus (McKenna 1962, Kawamura 1988), trigon basin (Zhou <i>et al</i> 1975)                                       |
|                     | posterior valley         | pv   | posterofossette (Tong, 2007, McKenna 1962, Kawamura 1988)  |
| anterior flexus     | af                       |  |  |
| central flexus      | cf                       |  |  |
| posterior flexus    | pf                       | posterolingual (diagonal) flexus (Tong, 2007, McKenna 1962, Kawamura 1988) |  |
| Lower<br>cheekteeth | protoconid               | prd  |  |
|                     | hypoconid                | hyd  |  |
|                     | metaconid                | med  | parametaconid (James, 1963)  |

|  |                         |       |  |
|--|-------------------------|-------|--|
|  | entoconid               | end   |  |
|  | mesoconid               | msd   |  |
|  | paraconid               | pad   | anterobuccal cingulum (Qiu <i>et al</i> 2019),<br>anteroconulid (Tong, 2007)   |
|  | ectostylid              | ecstd |  |
|  | metastylid              | mestd | mesostylid (Kawamura 1988)   |
|  | hypoconulid             | hycud | metaconulid (Tong, 2007)   |
|  | anterolophid            | anld  | protolophid (James, 1963)  |
|  | protolophid             | prld  | metalophulid (Qiu <i>et al</i> 2019)   |
|  | entolophid              | enld  |  |
|  | ectolophid              | eclld |  |
|  | posterolophid           | pold  |  |
|  | anterobuccal<br>sinusid | asd   |  |
|  | hypoflexid              | hyfd  | buccal valley (Qiu <i>et al</i> 2019)  |
|  | anterior<br>fossettoid  | afd   | trigonid basin (Qiu <i>et al</i> 2019)<br>trigonid or anterior valley (James, 1963)  |
|  | central flexid          | cfid  | talonid basin (Qiu <i>et al</i> 2019)<br>“lingual-flexid+medifossettoid” (Tong, 2007),<br>lingual flexid+metafossettoid (Kawamura 1988),<br>lingual diagonal flexid (McKenna 1962) |
|  | posterior<br>fossettoid | pfid  | talonid basin (Qiu <i>et al</i> 2019)<br>talonid basin remnant (McKenna 1962,<br>Kawamura 1988)  |

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**Supplementary Table S2**

GenBank accession numbers for 12S ribosomal RNA (12S), 16S ribosomal RNA (16S), and interphotoreceptor retinoid-binding protein (*IRBP*) sequences utilized in this study.

| Species                          | 12S rRNA gene | 16S rRNA gene | IRBP       |
|----------------------------------|---------------|---------------|------------|
| <i>Aeromys tephromelas</i>       | AY227536.1    | AY227482.1    | AY227594.1 |
| <i>Belomys pearsonii</i>         | AY227537.1    | AY227483.1    | AY227595.1 |
| <i>Biswamoyopterus biswasi</i>   | MK105526.1    | MK105519.1    | MK105534.1 |
|                                  | MK105527.1    | MK105520.1    | MK105535.1 |
| <i>Eoglaucmys fimbriatus</i>     | AY227562.1    | AY227485.1    | AY227597.1 |
| <i>Eupetaurus cinereus</i>       | AY227538.1    | AY227484.1    | AY227596.1 |
| <i>Glaucmys volans</i>           | AY227559.1    | AY227486.1    | AY227598.1 |
| <i>Hylopetes phayrei</i>         | AY227539.1    | AY227487.1    | AY227599.1 |
| <i>Hylopetes alboniger</i>       | MW929356      | MW929360      | MW929363   |
| <i>Iomys horsfieldii</i>         | AY227540.1    | AY227488.1    | AY227600.1 |
| <i>Petaurillus kinlochii</i>     | AY227542.1    | AY227490.1    | AY227602.1 |
| <i>Petaurista alborufus lena</i> | AY227541.1    | AY227489.1    | AY227601.1 |
| <i>Petaurista elegans</i>        | MW929357      | MK105524.1    | MK105539.1 |
| <i>Petaurista philippensis</i>   | MK105528.1    | MK105521.1    | MK105536.1 |
| <i>Petinomys setosus</i>         | AY227544.1    | AY227492.1    | AY227604.1 |
| <i>Pteromys volans</i>           | AY227545.1    | AY227493.1    | AY227605.1 |
| <i>Pteromyscus pulverulentus</i> | AY227543.1    | AY227491.1    | AY227603.1 |
| <i>Trogopterus xanthipes</i>     | AY227546.1    | AY227494.1    | AY227606.1 |
| <i>Priapomys leonardi</i>        | MW929354      | MW929358      | MW929361   |
|                                  | MW929355      | MW929359      | MW929362   |
| <i>Aplodontia rufa</i>           | AY227508.1    | AY227451.1    | AY227564.1 |
| <i>Ratufa bicolor</i>            | AY227548.1    | AY227496.1    | AY227608.1 |
| <i>Tamiasciurus hudsonicus</i>   | AY227555.1    | AY227504.1    | AY227622.1 |
| <i>Sciurus vulgaris</i>          | AY227553.1    | AY227501.1    | AY227620.1 |

**Supplementary Table S3**

Primers and PCR conditions for amplification and sequencing used in the genetic analyses.

| Gene        | Primer Sequence                              |  | Annealing temp | Remarks             |
|-------------|--|--|----------------|---------------------|
|             | Forward                                      | Reverse  |                |                     |
| 12S<br>rRNA | rRNA-L613-hk1:<br>GGCGGGCGAGCAAAGCACTGAAAATG | rRNA-H1478-hk1:<br>TGATTGGTGGAGGGTGACGAGCGGTGTGT | 56             | (He et al. 2010)    |
| 16S<br>rRNA | 16Sar-L: CGCCTGTTTATCAAAAACAT                | 16Sbr-H: CCGGTCTGAACTCAGATCACGT                  | 52             | (He et al. 2010)    |
| IRBP        | IRBPA:<br>ATGGCCAAGGTCCTCTTGGATAACTACTGCTT   | IRBPB:<br>CGCAGGTCCATGATGAGGTGCTCCGTGTCCTG       | 61             | (Jansa et al. 2009) |

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**Supplementary Table S4**

Character loading and percentage of variance explained on the components of the principal component analysis, morphological measurements from *Pteromys (Hylopetes) leonardi* (= *Priapomys leonardi*) and related species (“similar sized + sympatric/parapatric” or “genetic similarity”).

| Variables  | PC 1   | PC 2   | PC 3   | PC 4   | PC 5   | PC 6   | PC 7   | PC 8   | PC 9   | PC 10  | PC 11  | PC 12  | PC 13  | PC 14  | PC 15  | PC 16  | PC 17  | PC 18  | PC 19  | PC 20  |
|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| GLS        | 0.229  | -0.011 | 0.014  | -0.004 | -0.032 | -0.195 | 0.038  | 0.053  | -0.001 | -0.139 | -0.084 | 0.072  | 0.026  | 0.082  | 0.030  | 0.012  | -0.048 | 0.052  | 0.855  | 0.359  |
| CBL        | 0.250  | -0.001 | 0.019  | 0.038  | -0.012 | -0.157 | 0.034  | 0.050  | -0.171 | -0.160 | -0.005 | 0.049  | 0.029  | 0.062  | 0.103  | 0.340  | -0.012 | -0.138 | 0.195  | -0.814 |
| LN         | 0.275  | -0.128 | -0.053 | -0.044 | -0.232 | -0.105 | 0.688  | 0.217  | 0.447  | -0.040 | -0.107 | 0.221  | 0.008  | -0.074 | -0.101 | -0.118 | 0.003  | -0.013 | -0.161 | -0.028 |
| ABN        | 0.234  | 0.148  | 0.069  | -0.162 | -0.108 | 0.630  | 0.005  | 0.310  | 0.035  | -0.004 | -0.249 | -0.414 | 0.106  | 0.305  | -0.041 | 0.047  | -0.187 | 0.091  | 0.032  | -0.028 |
| PBN        | 0.149  | 0.073  | -0.701 | -0.177 | 0.614  | -0.053 | 0.134  | 0.076  | -0.061 | -0.049 | 0.072  | -0.137 | 0.075  | -0.017 | -0.021 | -0.072 | -0.062 | 0.023  | -0.024 | 0.006  |
| IOB        | 0.225  | 0.019  | -0.071 | -0.149 | 0.033  | 0.446  | -0.199 | -0.391 | 0.345  | -0.443 | 0.222  | 0.287  | -0.187 | -0.101 | -0.047 | 0.119  | 0.085  | -0.114 | 0.019  | 0.024  |
| ZB         | 0.264  | 0.021  | 0.075  | -0.006 | -0.048 | 0.057  | 0.059  | -0.219 | -0.195 | 0.048  | -0.014 | 0.001  | -0.060 | -0.145 | 0.533  | -0.485 | -0.442 | -0.293 | -0.043 | -0.009 |
| BOC        | 0.242  | 0.063  | -0.015 | -0.097 | -0.047 | -0.275 | -0.128 | -0.421 | 0.057  | -0.060 | -0.384 | -0.175 | -0.068 | 0.411  | -0.150 | -0.364 | 0.346  | 0.068  | -0.099 | -0.099 |
| BPP        | 0.227  | 0.049  | -0.069 | 0.020  | -0.128 | -0.007 | 0.102  | -0.459 | -0.047 | 0.452  | 0.243  | 0.085  | 0.363  | 0.204  | -0.289 | 0.268  | -0.309 | -0.008 | -0.025 | 0.077  |
| MB         | 0.178  | -0.015 | 0.041  | 0.248  | 0.009  | 0.199  | 0.220  | -0.225 | 0.009  | 0.157  | 0.170  | -0.351 | 0.186  | -0.360 | 0.270  | -0.005 | 0.492  | 0.305  | 0.123  | -0.048 |
| LIF        | 0.215  | -0.688 | 0.382  | -0.144 | 0.476  | 0.033  | -0.119 | 0.073  | 0.100  | 0.186  | 0.004  | 0.055  | 0.082  | 0.102  | 0.020  | -0.002 | 0.029  | -0.008 | -0.035 | 0.006  |
| PL         | 0.263  | -0.060 | -0.046 | 0.090  | -0.089 | -0.230 | 0.027  | 0.041  | -0.050 | -0.132 | 0.148  | -0.165 | -0.340 | 0.300  | 0.407  | 0.451  | -0.015 | 0.141  | -0.303 | 0.313  |
| PPL        | 0.233  | 0.093  | 0.180  | -0.005 | 0.111  | 0.092  | 0.171  | -0.011 | -0.607 | -0.262 | -0.309 | 0.270  | 0.183  | -0.192 | -0.175 | 0.139  | 0.158  | -0.022 | -0.215 | 0.238  |
| LAB        | 0.011  | 0.483  | 0.254  | 0.404  | 0.486  | 0.066  | 0.120  | -0.030 | 0.248  | 0.238  | -0.203 | 0.200  | -0.222 | 0.129  | 0.069  | 0.092  | -0.022 | -0.050 | 0.030  | -0.010 |
| BIF        | 0.220  | 0.125  | 0.258  | 0.215  | 0.075  | -0.062 | 0.058  | 0.189  | -0.164 | -0.190 | 0.604  | -0.163 | -0.172 | 0.112  | -0.401 | -0.339 | -0.028 | 0.020  | -0.021 | -0.031 |
| LP4M3      | 0.231  | -0.023 | -0.146 | 0.411  | -0.080 | -0.081 | -0.311 | 0.210  | 0.191  | -0.017 | -0.059 | -0.154 | 0.316  | -0.081 | -0.044 | 0.045  | 0.163  | -0.607 | -0.093 | 0.154  |
| IBPP4      | 0.203  | 0.358  | 0.296  | -0.483 | 0.065  | -0.339 | -0.178 | 0.046  | 0.223  | 0.049  | -0.001 | -0.245 | 0.047  | -0.444 | -0.060 | 0.148  | -0.106 | 0.031  | -0.079 | 0.034  |
| IBPM3      | 0.158  | 0.251  | -0.054 | -0.331 | -0.110 | 0.066  | -0.140 | 0.300  | -0.099 | 0.351  | 0.258  | 0.414  | 0.064  | 0.207  | 0.242  | -0.128 | 0.421  | -0.056 | 0.001  | 0.008  |
| lp4m3      | 0.225  | 0.019  | -0.102 | 0.297  | -0.049 | -0.067 | -0.389 | 0.151  | 0.119  | -0.101 | -0.076 | 0.293  | 0.254  | -0.086 | 0.060  | -0.151 | -0.237 | 0.613  | -0.129 | -0.084 |
| HM         | 0.286  | -0.151 | -0.222 | 0.082  | -0.142 | 0.096  | -0.165 | 0.067  | -0.152 | 0.413  | -0.175 | 0.014  | -0.606 | -0.315 | -0.283 | 0.035  | 0.000  | 0.022  | 0.066  | -0.035 |
| Eigenvalue | 0.028  | 0.006  | 0.003  | 0.002  | 0.001  | 0.001  | 0.001  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  |
| % variance | 65.504 | 13.251 | 6.311  | 5.265  | 3.431  | 1.359  | 1.192  | 0.836  | 0.757  | 0.479  | 0.418  | 0.358  | 0.272  | 0.238  | 0.118  | 0.092  | 0.069  | 0.025  | 0.019  | 0.006  |

Supplementary Table S5

Measurements recorded from *P. (H.) leonardi* (= *Priapomys leonardi*) and related species ("similar sized + sympatric/parapatric" or "genetic similarity"). Abbrev:

B=broken, N=not measured, LP4M3=length from the fourth upper premolar to the third molar, lp4m3=length from the fourth lower premolar to the third molar.

| ID            | species                    | GLS   | CBL   | LN    | ABN  | PBN  | IOB   | ZB    | BOC   | BPP   | MB    | LIF  | PL    | PPL   | LAB  | BIF   | LP3M3 | LP4M3 | IBPP4 | IBPM3 | BP4  | BM1  | BM3  | lp4m3 | HM    |
|---------------|----------------------------|-------|-------|-------|------|------|-------|-------|-------|-------|-------|------|-------|-------|------|-------|-------|-------|-------|-------|------|------|------|-------|-------|
| FM 108900     | <i>Iomys horstfieldii</i>  | 45.23 | 40.91 | 14.32 | 6.67 | 3.87 | 8.56  | 26.82 | 9.73  | 15.35 | 19.25 | 2.93 | 24.17 | 13.51 | 6.77 | 10.83 | N     | 8.63  | 5.36  | 5.97  | N    | N    | N    | 8.54  | 17.28 |
| FM 108898     | <i>Iomys horstfieldii</i>  | 44.83 | 41.17 | 14.29 | 7.06 | 4.16 | 9.62  | 26.73 | 9.64  | 15.19 | 19.86 | 3.08 | 23.65 | 14.17 | 7.04 | 10.89 | N     | 8.69  | 5.43  | 5.94  | N    | N    | N    | 8.66  | 17.14 |
| FM 108901     | <i>Iomys horstfieldii</i>  | 44.03 | 40.99 | 13.63 | 7.12 | 4.12 | 9.29  | 27.12 | 9.74  | 14.87 | 19.71 | 2.99 | 24.00 | 13.92 | 6.55 | 10.29 | N     | 8.93  | 5.04  | 5.80  | N    | N    | N    | 8.68  | 17.61 |
| FM 108899     | <i>Iomys horstfieldii</i>  | 46.33 | 42.21 | 15.32 | 7.03 | 4.03 | 9.63  | 28.68 | 10.07 | 15.80 | 19.85 | 3.08 | 24.26 | 14.67 | 6.80 | 10.96 | N     | 8.61  | 5.64  | 6.54  | N    | N    | N    | 8.80  | 17.73 |
| FM 108897     | <i>Iomys horstfieldii</i>  | 45.69 | 41.87 | 15.06 | 8.13 | 4.20 | 10.46 | 28.67 | 9.88  | 15.84 | 20.65 | 3.34 | 23.17 | 15.25 | 7.13 | B     | N     | 9.11  | 5.65  | 6.28  | N    | N    | N    | 9.23  | 18.77 |
| AMNH 185170   | <i>Iomys horstfieldii</i>  | 44.55 | 41.53 | 13.84 | 6.98 | 3.76 | 9.03  | 28.14 | 9.70  | 16.80 | 21.40 | 2.90 | 23.97 | 14.55 | 7.79 | 10.60 | N     | 9.23  | 5.07  | 5.69  | N    | N    | N    | 9.02  | 18.16 |
| AMNH 185169   | <i>Iomys horstfieldii</i>  | 42.91 | 39.46 | 12.77 | 6.90 | 4.28 | 9.21  | 26.99 | 9.37  | 14.95 | 20.72 | 3.11 | 22.80 | 13.32 | 7.33 | 10.42 | N     | 8.81  | 5.45  | 5.85  | N    | N    | N    | 8.70  | 16.84 |
| AMNH 103313   | <i>Iomys sipora</i>        | 45.36 | 41.79 | 13.92 | 7.10 | 4.51 | 9.49  | 26.66 | 9.36  | 14.98 | 20.22 | 3.14 | 24.62 | 13.59 | 7.40 | 11.10 | N     | 10.38 | 4.97  | 5.73  | N    | N    | N    | 10.03 | 19.71 |
| AMNH 103151   | <i>Iomys sipora</i>        | B     | B     | 13.48 | 6.32 | 4.53 | 9.06  | 26.64 | B     | B     | B     | 3.17 | 24.50 | B     | 7.78 | 11.08 | N     | 10.28 | 4.78  | 5.84  | N    | N    | N    | 10.12 | 19.35 |
| AMNH 163556   | <i>Hylopetes phayrei</i>   | 37.68 | 34.93 | 9.57  | 5.74 | 4.26 | 8.21  | 23.16 | 8.75  | 13.20 | 17.25 | 2.02 | 19.12 | 13.09 | 8.76 | 9.74  | 7.85  | 7.46  | 5.49  | 5.71  | N    | N    | N    | 7.66  | 14.06 |
| AMNH 163555   | <i>Hylopetes phayrei</i>   | 39.50 | 35.61 | 11.01 | 6.75 | 3.71 | 8.11  | 24.20 | 8.67  | 13.88 | 17.80 | 2.12 | 19.73 | 13.32 | 8.67 | 10.17 | 7.92  | 7.63  | 5.53  | 6.18  | N    | N    | N    | 7.95  | 14.10 |
| AMNH 163557   | <i>Hylopetes phayrei</i>   | 40.75 | 37.54 | 12.01 | 6.67 | 3.89 | 7.97  | 24.72 | 8.55  | 13.80 | 18.00 | 2.36 | 20.91 | 13.70 | 8.93 | 10.66 | 8.15  | 7.98  | 5.87  | 6.46  | N    | N    | N    | 8.18  | 14.60 |
| AMNH 163554   | <i>Hylopetes phayrei</i>   | 39.76 | 35.95 | 11.38 | 6.66 | 4.56 | 8.62  | 24.06 | 8.59  | 13.97 | 18.34 | 2.24 | 20.06 | 12.45 | 8.98 | 10.35 | 8.29  | 7.89  | 5.77  | 6.02  | N    | N    | N    | 7.92  | 14.13 |
| AMNH 163553   | <i>Hylopetes phayrei</i>   | 39.36 | 36.37 | 11.02 | 6.97 | 3.52 | 8.20  | 24.11 | 8.44  | 13.50 | 17.55 | 2.19 | 20.19 | 13.26 | 8.56 | 10.03 | 8.24  | 7.63  | 5.25  | 6.22  | N    | N    | N    | 7.97  | 14.49 |
| AMNH 167892   | <i>Hylopetes phayrei</i>   | 41.31 | 37.85 | 12.62 | 6.33 | 3.93 | 8.38  | 24.93 | 8.81  | 14.14 | 18.46 | 2.49 | 20.77 | B     | 8.65 | 9.84  | 8.80  | 8.42  | 5.59  | 5.86  | N    | N    | N    | 8.57  | 15.15 |
| AMNH 167891   | <i>Hylopetes phayrei</i>   | 40.96 | 37.39 | 12.54 | 6.57 | 4.06 | 9.25  | 25.24 | 9.29  | 14.48 | 18.75 | 3.00 | 21.08 | 13.64 | 8.89 | 10.31 | 7.81  | 7.43  | 5.71  | 5.73  | N    | N    | N    | 7.62  | 14.98 |
| AMNH 176893   | <i>Hylopetes phayrei</i>   | 41.40 | 38.16 | 12.11 | 7.25 | 4.41 | 9.75  | 25.51 | 9.18  | 14.29 | 18.82 | 2.64 | 21.37 | 13.87 | 8.82 | 10.73 | 8.64  | 8.04  | 5.98  | 6.35  | N    | N    | N    | 8.32  | 15.19 |
| FM 82836      | <i>Hylopetes phayrei</i>   | 38.56 | 33.74 | 11.80 | 6.69 | 3.38 | 8.04  | 23.06 | 8.67  | 13.24 | 18.12 | 2.13 | 18.67 | 12.06 | 8.80 | 9.73  | 8.37  | 7.97  | 5.53  | 5.71  | N    | N    | N    | 7.87  | 13.85 |
| FM 82837      | <i>Hylopetes phayrei</i>   | 40.29 | 36.51 | 11.84 | 6.30 | 3.35 | 8.07  | 23.39 | 8.78  | 12.34 | 17.83 | 2.69 | 20.84 | 12.87 | 8.58 | 10.02 | 8.31  | 8.02  | 5.37  | 5.33  | N    | N    | N    | 8.23  | 13.91 |
| FM 105548     | <i>Hylopetes alboniger</i> | 49.01 | 45.57 | 14.94 | 8.37 | 4.76 | 9.39  | 29.28 | 10.76 | 15.74 | 20.48 | 2.82 | 25.55 | 16.68 | 8.72 | 12.33 | 9.71  | 9.21  | 7.16  | 7.13  | N    | N    | N    | 9.20  | 19.10 |
| FM 105547     | <i>Hylopetes alboniger</i> | 46.77 | 43.64 | 13.63 | 8.67 | 3.49 | 10.40 | 30.17 | 10.53 | 16.67 | 20.83 | 2.51 | 24.65 | 15.43 | 8.60 | 12.20 | 10.13 | 9.51  | 7.37  | 7.61  | N    | N    | N    | 9.53  | 18.77 |
| AMNH 114886   | <i>Hylopetes alboniger</i> | 52.62 | 49.05 | 16.06 | 8.71 | 5.38 | 10.64 | 32.92 | 11.70 | 17.98 | 22.50 | 3.36 | 27.83 | 17.32 | 9.16 | 12.98 | 11.18 | 10.08 | 7.29  | 7.30  | N    | N    | N    | 10.09 | 19.83 |
| AMNH 114885   | <i>Hylopetes alboniger</i> | 51.46 | 47.91 | 16.05 | 8.23 | 4.74 | 10.68 | 33.28 | 11.30 | 17.19 | 23.02 | 2.84 | 26.93 | 17.01 | 9.11 | 12.93 | 10.72 | 9.96  | 7.03  | 6.96  | N    | N    | N    | 10.09 | 19.57 |
| AMNH 114884   | <i>Hylopetes alboniger</i> | 51.09 | 48.32 | 16.09 | 8.97 | 4.42 | 11.09 | 32.60 | 11.54 | 18.40 | 22.32 | 2.53 | 27.21 | 16.79 | 8.78 | 13.60 | 10.85 | 10.43 | 6.77  | 7.26  | N    | N    | N    | 10.46 | 19.82 |
| KIZ 034949    | <i>Hylopetes alboniger</i> | 50.53 | 46.74 | 15.43 | 7.65 | 3.90 | 9.79  | 31.14 | 11.35 | 17.08 | 21.25 | 2.54 | 27.20 | 16.00 | 8.66 | 12.97 | N     | 10.11 | 6.78  | 6.48  | N    | N    | N    | 10.23 | 19.08 |
| KIZ 019675    | <i>Hylopetes alboniger</i> | 50.30 | 47.20 | 15.11 | 8.23 | 4.34 | 10.56 | 31.19 | 10.77 | 17.16 | 21.51 | 2.48 | 26.18 | 17.27 | 9.29 | 13.08 | N     | 9.99  | 7.31  | 7.09  | N    | N    | N    | 10.28 | 17.57 |
| KIZ 034946    | <i>Hylopetes alboniger</i> | 50.10 | 46.75 | 13.46 | 8.26 | 4.51 | 10.68 | 32.11 | 11.55 | 16.75 | 21.85 | 3.14 | 25.93 | 17.35 | 8.64 | 12.30 | N     | 10.48 | 6.25  | 6.49  | N    | N    | N    | 10.67 | 19.51 |
| KIZ 034948    | <i>Hylopetes alboniger</i> | 49.16 | 45.05 | 15.01 | 7.44 | 4.33 | 10.24 | 30.66 | 11.14 | 17.33 | 21.91 | 2.80 | 25.33 | 16.12 | 9.77 | 12.23 | N     | 9.89  | 6.11  | 6.53  | N    | N    | N    | 10.12 | 19.04 |
| KIZ 034942    | <i>Hylopetes alboniger</i> | 48.82 | 45.06 | 13.69 | 7.94 | 4.18 | 10.56 | 30.13 | 11.23 | 16.81 | 21.09 | 3.15 | 26.44 | 14.97 | 9.35 | 12.80 | N     | 10.24 | 6.55  | 6.61  | N    | N    | N    | 10.34 | 18.49 |
| KIZ 034952    | <i>Priapomys leonardi</i>  | 46.14 | 42.31 | 13.82 | 7.24 | 3.54 | 9.15  | 29.05 | 10.53 | 15.61 | 20.22 | 3.40 | 24.25 | 14.74 | 7.65 | 11.43 | 9.18  | 8.59  | 6.71  | 6.04  | 2.16 | 2.51 | 2.54 | 8.55  | 17.34 |
| KIZ 034951    | <i>Priapomys leonardi</i>  | 46.68 | 43.11 | 14.01 | 7.64 | 4.31 | 9.33  | 29.65 | 10.09 | 15.12 | 19.33 | 3.56 | 23.91 | 15.83 | 7.95 | 11.44 | 9.46  | 8.80  | 6.08  | 6.30  | 2.19 | 2.61 | 2.46 | 8.96  | 18.14 |
| KIZ 034954    | <i>Priapomys leonardi</i>  | 44.98 | 40.89 | 13.20 | 6.92 | 3.54 | 9.39  | 28.09 | 9.95  | 14.93 | 18.96 | 3.16 | 23.35 | 14.18 | 7.63 | 11.46 | 9.07  | 8.61  | 6.39  | 6.33  | 2.13 | 2.53 | 2.40 | 8.91  | 16.32 |
| KIZ 410099    | <i>Priapomys leonardi</i>  | 45.99 | 42.24 | 13.75 | 7.78 | 3.73 | 10.24 | 29.87 | 9.78  | 15.58 | 20.21 | 3.60 | 23.57 | 15.62 | 7.46 | 11.74 | 8.92  | 8.23  | 6.46  | 6.51  | N    | N    | N    | 8.93  | 18.43 |
| BMNH 20.8.8.2 | <i>Priapomys leonardi</i>  | B     | B     | 12.87 | 6.81 | 3.74 | 8.93  | 26.59 | B     | B     | 18.78 | 3.50 | 22.52 | B     | B    | 11.35 | 8.80  | 8.54  | 6.66  | 6.33  | N    | N    | N    | 8.82  | 15.73 |
| KIZ 034940    | <i>Belomys pearsonii</i>   | 44.55 | 41.60 | 13.11 | 7.12 | 3.09 | 8.90  | 27.68 | 8.77  | 13.98 | 21.67 | 3.49 | 23.01 | 15.84 | 9.66 | 13.25 | N     | 8.93  | 5.44  | 5.33  | N    | N    | N    | 8.71  | 15.44 |
| KIZ 034965    | <i>Belomys pearsonii</i>   | 42.16 | 40.05 | 12.42 | 6.84 | 3.53 | 8.15  | 27.27 | 9.13  | 15.40 | 22.00 | 2.76 | 22.57 | 14.85 | 9.94 | 12.60 | N     | 9.44  | 5.18  | 5.60  | N    | N    | N    | 9.24  | 16.22 |

### Supplementary Table S6

Morphological comparison: when the phenotype of the examined specimens of the taxa are consistent, no additional modifiers are added; when there are a few exceptional individuals, "mostly" is added before the phenotype of most individuals; if the two phenotypes appear almost in a 1:1 ratio, recorded as "A or B".

Abbrev: present (P), absent (A), developed (D, very clear), reduced (R, obsolete, but recognizable); Anterior flexus (af), Central flexus (cf), Posterior flexus (pf).

| Genera                 | Skin      | Skull                 |                  | Glans            |   |
|------------------------|-----------|-----------------------|------------------|------------------|---|
|                        | Ear tufts | Auditory bulla septae | Coronoid process | Glans length /HB | Pattern   |
| <i>Aeretes</i>         | A         | <4                    | D                | unknown          | unknown   |
| <i>Aeromys</i>         | A         | <4                    | D                | unknown          | unknown   |
| <i>Belomys</i>         | P         | >4, honeycomb         | D                | 5%               | short and stout, two crests on the right side with thorns on the edge   |
| <i>Biswamoyopterus</i> | P         | >4, honeycomb         | D                | 4%               | long and stout, two smooth crests on the right side   |
| <i>Eoglaucmys</i>      | A         | <4                    | D                | 4%               | short, two smooth crests on the right side, two prominent spiniform processes on the left side  |
| <i>Eupetaurus</i>      | A         | <4                    | R                | 4%               | short, three crests on the right side with thorns on the edge   |
| <i>Glaucmys</i>        | A         | <4                    | D                | 7-16%            | <i>G. sabrinus</i> : long, three crests on the right side with thorns on the edge<br><i>G. volans</i> : very long (baculum is only half the length of the glans) and slim, straight, two crests on the right side with thorns on the edge |
| <i>Hylometes</i>       | A         | <4                    | D                | 7%               | long, two smooth crests on the right side, a prominent spiniform process on the left side   |
| <i>Iomys</i>           | A         | <4                    | D                | unknown          | The only sample available is a broken base, very slim.  |
| <i>Petaurillus</i>     | A         | <4                    | D                | unknown          | unknown   |
| <i>Petaurista</i>      | A         | <4                    | D                | 2-6%             | short and stout, one smooth crest on the right side   |
| <i>Petinomys</i>       | P         | >4, Cobweb*           | D                | unknown          | unknown, baculum can refer to Pocock 1923   |

|                    |   |                     |   |     |  |
|--------------------|---|---------------------|---|-----|--|
| <i>Priapomys</i>   | A | <4                  | D | 17% | very long (baculum as long as the glans) and slim, "S" shaped, two faint smooth crests on the right side   |
| <i>Pteromys</i>    | A | <4                  | R | 6%  | long, two crests on the right side with thorns on the edge, a prominent spiniform process on the left side |
| <i>Pteromyscus</i> | A | ca. 5,<br>honeycomb | D | 5%  | resembles <i>Belomys</i> , short and stout, two crests on the right side with thorns on the edge           |
| <i>Trogopterus</i> | P | >4,<br>honeycomb    | D | 3%  | resembles <i>Belomys</i> , short and stout, two crests on the right side with thorns on the edge           |

| Genera                 | Upper cheekteeth |                        |             |               |            |            |                            |                 | Lower cheekteeth |                          |
|------------------------|------------------|------------------------|-------------|---------------|------------|------------|----------------------------|-----------------|------------------|--------------------------|
|                        | P <sup>3</sup>   | mesostyle              | mesolophule | anterolophule | Paraconule | Metaconule | Metaloph on M <sup>3</sup> | Lingual flexus  | Hypoconulid      | protolophid & entolophid |
| <i>Aeretes</i>         | P                | mostly A               | A           | A             | D          | D          | D                          | D pf, R af & cf | mostly A         | D                        |
| <i>Aeromys</i>         | P                | P, isolated            | A           | A             | R          | R          | A                          | R af & cf       | A                | A                        |
| <i>Belomys</i>         | P                | P, connect to paracone | A           | A             | D          | D          | R                          | R af & cf       | D                | D                        |
| <i>Biswamoyopterus</i> | P                | P, connect to paracone | R           | A             | A          | R          | A                          | R af & cf       | mostly A         | A                        |
| <i>Eoglaucomys</i>     | P                | mostly A               | A           | mostly A      | R          | R          | R                          | R af            | A                | mostly A                 |
| <i>Eupetaurus</i>      | P                | A                      | A           | A             | very D     | A          | D                          | D cf            | A                | D                        |
| <i>Glaucomys</i>       | P                | mostly A               | mostly R    | A             | A          | A          | A                          | R af            | A                | A                        |
| <i>Hylopetes</i>       | P                | mostly P,              | mostly P,   | mostly R      | mostly A   | mostly A   | A                          | R af            | A                | A                        |



|                    |          | connect to mesolophule                    | connect to mesostyle           |          |   |          |          |                 |        |        |
|--------------------|----------|---|--------------------------------|----------|---|----------|----------|-----------------|--------|--------|
| <i>Iomys</i>       | A        | mostly A                                  | A                              | A        | A | A        | A        | R af & cf       | A      | D      |
| <i>Petaurillus</i> | mostly P | A   | A                              | A        | A | A        | mostly A | R af            | A      | A      |
| <i>Petaurista</i>  | P        | mostly P, isolated or connect to paracone | mostly A                       | A        | D | D        | D        | D pf, R af & cf | A or R | D      |
| <i>Petinomys</i>   | P        | mostly P, connect to mesolophule          | mostly P, connect to mesostyle | R or A   | A | mostly R | A        | A               | A      | A or R |
| <i>Priapomys</i>   | P        | mostly A                                  | R                              | R or A   | A | R        | A        | A               | A      | A      |
| <i>Pteromys</i>    | P        | mostly A                                  | A                              | mostly R | A | D        | R        | R af & cf       | A      | R      |
| <i>Pteromyscus</i> | mostly P | P, connect to paracone                    | A                              | A        | R | D        | R        | R af & cf       | D      | R      |
| <i>Trogopterus</i> | mostly P | P, connect to paracone                    | A                              | A        | D | D        | D        | R af & cf       | D      | D      |

\*exception: *Petinomys setosus* is honeycomb.

Pocock, R. I. 1923. The Classification of the Sciuridae. *Proceedings of the Zoological Society of London*, 1923: pp. 244, fig. 28.

**Supplementary Table S7A**

Average genetic distances (%) for 12S ribosomal RNA sequences between the groups of studied flying squirrel species

|                       | <i>Aeromys</i> | <i>Belomys</i> | <i>Biswamoypterus</i> | <i>Eoglaucmys</i> | <i>Eupetaurus</i> | <i>Glaucmys</i> | <i>Hylopetes</i> | <i>Iomys</i> | <i>Petaurillus</i> | <i>Petaurista</i> | <i>Petinomys</i> | <i>Pteromys</i> | <i>Pteromyscus</i> | <i>Trogopterus</i> |
|-----------------------|----------------|----------------|-----------------------|-------------------|-------------------|-----------------|------------------|--------------|--------------------|-------------------|------------------|-----------------|--------------------|--------------------|
| <i>Belomys</i>        | 0.094          |                |                       |                   |                   |                 |                  |              |                    |                   |                  |                 |                    |                    |
| <i>Biswamoypterus</i> | 0.073          | 0.119          |                       |                   |                   |                 |                  |              |                    |                   |                  |                 |                    |                    |
| <i>Eoglaucmys</i>     | 0.088          | 0.109          | 0.089                 |                   |                   |                 |                  |              |                    |                   |                  |                 |                    |                    |
| <i>Eupetaurus</i>     | 0.075          | 0.104          | 0.108                 | 0.096             |                   |                 |                  |              |                    |                   |                  |                 |                    |                    |
| <i>Glaucmys</i>       | 0.087          | 0.123          | 0.09                  | 0.082             | 0.091             |                 |                  |              |                    |                   |                  |                 |                    |                    |
| <i>Hylopetes</i>      | 0.12           | 0.152          | 0.115                 | 0.123             | 0.126             | 0.103           |                  |              |                    |                   |                  |                 |                    |                    |
| <i>Iomys</i>          | 0.099          | 0.115          | 0.117                 | 0.088             | 0.1               | 0.091           | 0.107            |              |                    |                   |                  |                 |                    |                    |
| <i>Petaurillus</i>    | 0.125          | 0.138          | 0.124                 | 0.116             | 0.118             | 0.116           | 0.1              | 0.102        |                    |                   |                  |                 |                    |                    |
| <i>Petaurista</i>     | 0.109          | 0.139          | 0.114                 | 0.106             | 0.106             | 0.099           | 0.117            | 0.12         | 0.117              |                   |                  |                 |                    |                    |
| <i>Petinomys</i>      | 0.127          | 0.15           | 0.113                 | 0.111             | 0.134             | 0.105           | 0.1              | 0.094        | 0.124              | 0.122             |                  |                 |                    |                    |
| <i>Pteromys</i>       | 0.102          | 0.117          | 0.116                 | 0.099             | 0.102             | 0.108           | 0.136            | 0.109        | 0.144              | 0.131             | 0.13             |                 |                    |                    |
| <i>Pteromyscus</i>    | 0.089          | 0.09           | 0.103                 | 0.105             | 0.087             | 0.112           | 0.148            | 0.118        | 0.134              | 0.131             | 0.134            | 0.112           |                    |                    |
| <i>Trogopterus</i>    | 0.09           | 0.054          | 0.093                 | 0.098             | 0.102             | 0.112           | 0.134            | 0.113        | 0.134              | 0.128             | 0.127            | 0.103           | 0.074              |                    |
| <i>Priapomys</i>      | 0.124          | 0.142          | 0.107                 | 0.089             | 0.116             | 0.095           | 0.104            | 0.069        | 0.112              | 0.126             | 0.097            | 0.124           | 0.124              | 0.122              |

**Supplementary Table S7B**

Average genetic distances (%) for 16S ribosomal RNA sequences between the groups of studied flying squirrel species

|                       | <i>Aeromys</i> | <i>Belomys</i> | <i>Biswamoypterus</i> | <i>Eoglaucmys</i> | <i>Eupetaurus</i> | <i>Glaucmys</i> | <i>Hylopetes</i> | <i>Iomys</i> | <i>Petaurillus</i> | <i>Petaurista</i> | <i>Petinomys</i> | <i>Pteromys</i> | <i>Pteromyscus</i> | <i>Trogopterus</i> |
|-----------------------|----------------|----------------|-----------------------|-------------------|-------------------|-----------------|------------------|--------------|--------------------|-------------------|------------------|-----------------|--------------------|--------------------|
| <i>Belomys</i>        | 0.12           |                |                       |                   |                   |                 |                  |              |                    |                   |                  |                 |                    |                    |
| <i>Biswamoypterus</i> | 0.052          | 0.093          |                       |                   |                   |                 |                  |              |                    |                   |                  |                 |                    |                    |
| <i>Eoglaucmys</i>     | 0.117          | 0.121          | 0.081                 |                   |                   |                 |                  |              |                    |                   |                  |                 |                    |                    |
| <i>Eupetaurus</i>     | 0.085          | 0.111          | 0.077                 | 0.11              |                   |                 |                  |              |                    |                   |                  |                 |                    |                    |
| <i>Glaucmys</i>       | 0.099          | 0.121          | 0.098                 | 0.068             | 0.114             |                 |                  |              |                    |                   |                  |                 |                    |                    |
| <i>Hylopetes</i>      | 0.109          | 0.13           | 0.094                 | 0.091             | 0.121             | 0.079           |                  |              |                    |                   |                  |                 |                    |                    |
| <i>Iomys</i>          | 0.094          | 0.106          | 0.086                 | 0.085             | 0.107             | 0.078           | 0.072            |              |                    |                   |                  |                 |                    |                    |
| <i>Petaurillus</i>    | 0.104          | 0.109          | 0.093                 | 0.075             | 0.112             | 0.066           | 0.068            | 0.059        |                    |                   |                  |                 |                    |                    |
| <i>Petaurista</i>     | 0.123          | 0.136          | 0.122                 | 0.127             | 0.126             | 0.124           | 0.104            | 0.107        | 0.102              |                   |                  |                 |                    |                    |
| <i>Petinomys</i>      | 0.109          | 0.127          | 0.11                  | 0.078             | 0.132             | 0.099           | 0.079            | 0.097        | 0.08               | 0.116             |                  |                 |                    |                    |
| <i>Pteromys</i>       | 0.109          | 0.109          | 0.098                 | 0.096             | 0.096             | 0.106           | 0.115            | 0.094        | 0.073              | 0.118             | 0.101            |                 |                    |                    |
| <i>Pteromyscus</i>    | 0.109          | 0.085          | 0.11                  | 0.131             | 0.114             | 0.121           | 0.147            | 0.121        | 0.108              | 0.133             | 0.146            | 0.121           |                    |                    |
| <i>Trogopterus</i>    | 0.114          | 0.055          | 0.086                 | 0.108             | 0.101             | 0.109           | 0.11             | 0.104        | 0.094              | 0.123             | 0.119            | 0.096           | 0.073              |                    |
| <i>Priapomys</i>      | 0.113          | 0.12           | 0.092                 | 0.093             | 0.109             | 0.084           | 0.065            | 0.056        | 0.06               | 0.113             | 0.098            | 0.105           | 0.133              | 0.102              |

