Supplementary information 3:
Posterior probabilities of allocation of type specimens to species clusters

Setting 1: *cinerea / fuscocinerea / selysi*
Area considered: AUS, CRO, FRA, GER, SWE, SWI, ITA (all material < 16°E)
Characters: CS, CL/CW_{1400}, SL/CS_{1400}, EYE/CS_{1400}, PeW/CS_{1400}, $nGen_{1400}$, nCH_{1400}, nGu_{1400}, $nPrMe_{1400}$, $nHFex_{1400}$, $nHFfl_{1400}$, nHT_{1400}, nPE_{1400}
number of reference individuals: *cinerea* 138, *fuscocinerea* 188, *selysi* 88
sample means of wild-card runs (for *italica* see also setting 4)

	p (cine)	p (fuci)	p (sely)
ITA: Tirol, coll. Mayr, type *F. cinerea* (n=1)	**0.9731**	0.0269	0.0000
ITA: Tirol, Bozen, type *F. cinerea subrufoides* (n=3)	**0.9994**	0.0006	0.0000
SWI: Zürich, Einsiedeln, lectotype series *F. fuscocinerea* (n=2)	0.0038	**0.9962**	0.0000
SWI: Zürich, lectotype *F. lefrancoisi* (n=1)	0.0013	**0.9987**	0.0000
FRA: Grande Chartreuse, paratypes *F. lefrancoisi* (n=2)	0.0698	**0.9302**	0.0000
ITA: Monte Martinello, type *italica* (n=2)	0.3455	**0.6545**	0.0000
FRA: St. Etienne de Tinee, type *F. selysi* (n=5)	0.0001	0.0000	**0.9999**

Setting 2: *cinerea / balcanina / georgica*
Area considered: ARM, E-AUS, AZE, BOS, BUL, BYR, GEO, MAK, E-POL, ROM, RUS, SER, E-SLA, TUR, UKR
13 characters: CS, CL/CW_{1400}, EYE/CS_{1400}, PeW/CS_{1400}, SL/CS_{1400}, $nGen_{1400}$, nCH_{1400}, nGu_{1400}, $nPrMe_{1400}$, $nHFex_{1400}$, $nHFfl_{1400}$, nHT_{1400}, nPE_{1400}
number of reference individuals: *cinerea* 207, *balcanina* 165, *georgica* 71
sample means of wild-card runs

	p (cine)	p (balc)	p (geor)
ARM: Mt.Ararat, lectotype *F. cinerea armenica* (n=1)	**0.9997**	0.0003	0.0000
UKR: Rybalchanska Dacha, type sample *F. cinerea ochracea* (n=4)	**0.9998**	0.0002	0.0000
UKR: Korsunski Monasteri, type sample *F. cinerea sabulosa* (n=4)	**1.0000**	0.0000	0.0000
GRE: Drosopygi, 19840901, paratypes *F. balcanina* (n=3)	0.0000	**1.0000**	0.0000
GEO: Passanauri, 19840724, holotype series *F. georgica* (n=3)	0.0001	0.0000	**0.9999**

Setting 3: *cinerea / torrentium / selysi*
Area considered: whole Palaearctic
Characters: CS, CL/CW_{1400}, SL/CS_{1400}, EYE/CS_{1400}, PeW/CS_{1400}, $nGen_{1400}$, nCH_{1400}, nGu_{1400}, $nPrMe_{1400}$, $nHFex_{1400}$, $nHFfl_{1400}$, nHT_{1400}, nPE_{1400}
number of reference individuals: *cinerea* 344, *torrentium* 84, *selysi* 90
sample means of wild-card runs

	p (cine)	p (sely)	p (torr)
ITA: Tirol, coll. Mayr, type *cinerea* (n=1)	**0.9812**	0.0057	0.0188
ITA: Tirol, Bozen, type *F. cinerea subrufoides* (n=3)	**0.9970**	0.0004	0.0030
ARM: Mt.Ararat, lectotype *armenica* (n=1)	**0.9951**	0.0003	0.0049
SPA: Pyrenees, type *iberica* (n=1)	**0.9982**	0.0000	0.0018
UKR: Rybalchanska Dacha, type sample *ochracea* (n=4)	**0.9901**	0.0000	0.0099
UKR: Korsunski Monasteri, type sample *sabulosa* (n=4)	**0.9990**	0.0000	0.0010
FRA: St. Etienne de Tinee, type *selysi* (n=5)	0.0000	**1.0000**	0.0000
FRA: Col de Tourmalet, topotypical sample *torrentium* (n=3)	0.0001	0.0005	**0.9994**

Setting 4: *cinerea / fuscocinerea*
Area considered: AUS, CRO, FRA, GER, SWI, ITA
15 Characters: CS, CL/CW_{1400}, SL/CS_{1400}, EYE/CS_{1400}, OceD/CS_{1400}, PEW/CS_{1400}, $nGen_{1400}$, nCH_{1400}, nGu_{1400}, $nPrMe_{1400}$, $nHFfl_{1400}$, nPE_{1400}, MtSt/CS_{1400}, MtMtP/CS_{1400}, MtMtP/CS_{1400}
number of reference individuals: *cinerea* 121, *fuscocinerea* 182
sample mean of wild-card run

	p (cine)	p (fuci)
ITA: Monte Martinello, type *fuscocinerea italica* (n=2)	0.0023	**0.9977**

Setting 5: *cinerea / georgica*
Area considered: ARM, AZE, GEO, ROM, RUS, TUR, UKR
14 Characters: CS, CL/CW_{1400}, EYE/CS_{1400}, PeW/CS_{1400}, SL/CS_{1400}, GHL/CS_{1400}, $nGen_{1400}$, nCH_{1400}, nGu_{1400}, $nPrMe_{1400}$, $nHFex_{1400}$, $nHFfl_{1400}$, nHT_{1400}, nPE_{1400}
number of reference individuals: *cinerea* 174, *georgica* 71
sample means of wild-card runs

	p (cine)	p (geor)
ARM: Mt.Ararat, lectotype *F. cinerea armenica* (n=1)	**0.9999**	0.0001
UKR: Rybalchanska Dacha, type sample *F. cinerea ochracea* (n=4)	**0.9999**	0.0001
UKR: Korsunski Monasteri, type sample *F. cinerea sabulosa* (n=4)	**0.9999**	0.0001
GEO: Passanauri, 19840724, holotype series *F. georgica* (n=3)	0.0001	**0.9999**

Setting 6: *subpilosa / tarimica /* aggr. of *clarissima* + *litoralis* + *pamirica* + *kirgisica*
Area considered: AFG, AZE, CHI, IRAN, KAZ, KIR, MON, PAK, RUS, TAD, TKM, TUR, UZB
16 Characters: CS, CL/CW_{1400}, SL/CS_{1400}, EYE/CS_{1400}, PEW/CS_{1400}, OceD/CS_{1400}, $RipD_{1400}$, $sqPDG_{1400}$, GHL/CS_{1400}, nCH_{1400}, nGu_{1400}, nPn_{1400}, nMn_{1400}, $nPrMe_{1400}$, nPe_{1400}, $nHFfl_{1400}$
number of reference individuals: *subpilosa* 194, *tarimica* 126, aggr. 670
sample means of wild-card runs

	p (subp)	p (tari)	p (aggr.)
KAZ: Syr Darja, Lake Aral, lectotype series *subpilosa* (n=5)	**1.0000**	0.0000	0.0000
AZE: Vataga Khurshud, 19070320, syntypes *bipilosa* (n=3)	**1.0000**	0.0000	0.0003
CHI: Yengisar, 20040903-086, holotype series *tarimica* (n=6)	0.0001	**0.9999**	0.0000
CHI: v.Tsaijdam, 190505, lectotype *clarissima* (n=1)	0.0000	0.0000	**1.0000**
KIR: Issyk-Kul: Jeti Oguz, 20000723-252, topotypes *litoralis* (n=3)	0.0000	0.0000	**1.0000**
TAD: Chorogski Tr.-19590811, holotype *pamirica* (n=1)	0.0000	0.0000	**1.0000**
KIR: Shatkal vall.-19980728-119, holotype series *kirgisica* (n=5)	0.0000	0.0000	**1.0000**

Setting 7: *clarissima / litoralis / pamirica* + *kirgisica*
Area considered: CHI, IRAN, KAZ, KIR, MON, PAK, RUS, TAD
19 Characters: CS, CL/CW_{1400}, SL/CS_{1400}, EYE/CS_{1400}, PEW/CS_{1400}, OceD/CS_{1400}, $RipD_{1400}$, $sqPDG_{1400}$, GHL/CS_{1400}, nCH_{1400}, $nGen_{1400}$, nGu_{1400}, nPn_{1400}, nMn_{1400}, $nPrMe_{1400}$, nPe_{1400}, $HFex_{1400}$, $nHFfl_{1400}$, nHT_{1400}
number of reference individuals: *clarissima* 269, *litoralis* 278, aggr. *pamirica* + *kirgisica* 122
sample means of wild-card runs

	p (clma)	p (lito)	p(aggr.)
CHI: v.Tsaijdam, 190505, lectotype *clarissima* (n=1)	**0.9813**	0.0187	0.0000
KIR: Issyk-Kul: Jeti Oguz, 20000723-252, topotypes *litoralis* (n=3)	0.0027	**0.9921**	0.0052
TAD: Chorogski Tr.-19590811, holotype *pamirica* (n=1)	0.0000	0.0000	**1.0000**
KIR: Shatkal vall.-19980728-119, holotype series *kirgisica* (n=5)	0.0000	0.0009	**0.9991**

Setting 8: *pamirica / kirgisica*
Area considered: CHI, IRAN, KIR, TAD
11 Characters: CL/CW_{1400}, SL/CS_{1400}, $EYE/_{1400}$, PEW/CS_{1400}, $OceD/CS_{1400}$, GHL/CS_{1400}, nGu_{1400}, $nHFex_{1400}$, nCH_{1400}, $nHFfl_{1400}$, nHT_{1400},
number of reference individuals: *pamirica* 70, *kirgisica* 53
sample means of wild-card runs

	p (pami)	p (kirg)
TAD: Chorogski Tr.-19590811, holotype *pamirica* (n=1)	**0.9929**	0.0071
KIR: Shatkal vall.-19980728-119, holotype series *kirgisica* (n=5)	0.0005	**0.9995**

Setting 9: *rufibarbis / anatolica /*aggr. of *clara* + *lusatica* + *himalayensis* + *cunicularia* + *tianshanica* + *persica* + *glabridorsis* + *orangea* + *gebaueri*
Area considered: whole Palaearctic
15 Characters: CS, CL/CW_{1400}, SL/CS_{1400}, EYE/CS_{1400}, PEW/CS_{1400}, $OceD/CS_{1400}$, $RipD_{1400}$, $sqPDG_{1400}$, GHL/CS_{1400}, nGu_{1400}, nPn_{1400}, nMn_{1400}, $nPrMe_{1400}$, nPe_{1400}, $nHFfl_{1400}$
number of reference individuals: *rufibarbis* 317, *anatolica* 63, aggr. 1434
sample means of wild-card runs

	p (rufi)	p (anat)	p(aggr.)
FRA: St.Martin Vesubie, 2002, neotype sample *rufibarbis* (n=7)	**0.9999**	0.0000	0.0001
SWI: Zürich, Hospital, lectotype sample *cinereorufibarbis* (n=2)	**0.9881**	0.0000	0.0119
TUR: Halkapinar-32SE, 19970508, holotype sample *anatolica* (n=5)	0.0000	**1.0000**	0.0000

Setting 10: *orangea / tarimica /* aggr. of *rufibarbis* + *sinae* + *anatolica* + *clara* + *lusatica* + *himalayensis* + *cunicularia* + *tianshanica* + *persica* + *glabridorsis* + *gebaueri*
Area considered: whole Palaearctic
16 Characters: CS, CL/CW_{1400}, SL/CS_{1400}, EYE/CS_{1400}, PEW/CS_{1400}, $OceD/CS_{1400}$, $RipD_{1400}$, $sqPDG_{1400}$, GHL/CS_{1400}, nGu_{1400}, nPn_{1400}, nMn_{1400}, $nPrMe_{1400}$, nPe_{1400}, $nHFfl_{1400}$, $PIGM_{1400}$
number of reference individuals: *orangea* 79, *tarimica* 126, aggr. 2213
sample means of wild-card runs

	p (rufi)	p (anat)	p(aggr.)
KIR: Tshatkal valley, 19980728-115, holotype sample orangea (n=6)	**0.9936**	0.0000	0.0064
CHI: Yengisar, 20040903-086, holotype sample *tarimica* (n=6)	0.0000	**1.0000**	0.0000

Setting 11: *clara / cunicularia / lusatica*
Area considered: Palaearctic west of 60°E
18 Characters: CS, CL/CW_{1400}, SL/CS_{1400}, PEW/CS_{1400}, GHL/CS_{1400}, nPN_{1400}, nMn_{1400}, $nHFfL_{1400}$, nPE_{1400}, $RipD_{1400}$, $sqPDG_{1400}$, EYE/CS_{1400}, $OCED/CS_{1400}$, $MtSt/CS_{1400}$, $MtMtP/CS_{1400}$, $MtMtP/CS_{1400}$, $PIGM_{1400}$, $CONT_{1400}$
Number of reference individuals: *clara* 241, *lusatica* 216, *cunicularia* A + B 413
sample means of wild-card runs

	p (clar)	p (lusa)	p (cuni)
Syntype sample *clara*, Damaskus (n=6)	**0.9631**	0.0326	0.0042
Neotype sample *cunicularia*, Fumel 2008.07.25 (n=4)	0.0000	0.0000	**1.0000**
Holotype sample *lusatica*, Förstgen 1994.06.19-88 (n=5)	0.2138	**0.7858**	0.0004
Paratype sample *lusatica*, Förstgen 1994.06.19-12 (n=3)	0.0065	**0.9933**	0.0002
Paratype sample *lusatica*, Förstgen 1994.06.19-127 (n=3)	0.0024	**0.9976**	0.0000
Paratype sample *lusatica*, Förstgen 1994.06.19-59 (n=3)	0.0021	**0.9979**	0.0000
Paratype sample *lusatica*, Förstgen 1994.06.19-A1 (n=3)	0.0002	**0.9998**	0.0000
Paratype sample *lusatica*, Förstgen 1994.06.19-94 (n=3)	0.0206	**0.9793**	0.0000

Setting 12: *clara / himalayensis*

Area considered: Palaearctic east of 60°E but holotype series of *clara* added

13 Characters: CS, CL/CW_{1400}, SL/CS_{1400}, PEW/CS_{1400}, GHL/CS_{1400}, nPN_{1400}, nMn_{1400}, $RIPD_{1400}$, $sqPDG_{1400}$, $OCED/CS_{1400}$, $MtMtP/CS_{1400}$, $MtMtP/CS_{1400}$, $PIGM_{1400}$

Number of reference individuals: *clara* 218, *himalayensis* 45.

	p (clar)	p (hima)
Syntype sample *clara*, Damaskus (n=6)	**0.9874**	0.0126
holotype sample *himalayensis*, Fagu-3 E, 1996.09.29-389 (n=4)	0.0021	**0.9979**

Setting 13: *clara / cunicularia / lusatica*

Area considered: Palaearctic west of 60°E

10 Characters: CS, CL/CW_{1400}, SL/CS_{1400}, GHL/CS_{1400}, nPN_{1400}, nMn_{1400}, $nPrMe_{1400}$, nPE_{1400}, $PIGM_{1400}$, $CONT_{1400}$

Number of reference individuals: *clara* 334, *cunicularia* 542, *lusatica* 358

Comment: data of characters powerful in the separation of *clara* and *lusatica* (see setting 11) were not available in the types of *fuscoides* and *rubescens*. This mitigated the separation of *clara* and *lusatica.*

sample means of wild-card runs:

	p (clar)	p (cuni)	p (lusa)
Syntype sample *clara*, SYR: Damaskus (n=6)	**0.7783**	0.0052	0.2165
Neotype sample *cunicularia*, FRA: Fumel 2008.07.25 (n=4)	0.0001	**0.9999**	0.0000
Cotype sample *rubescens*, SWI: Vaux (n=4)	0.0020	**0.9975**	0.0005
Holotype sample *fuscoides*, ARM: Byurakan, No 1103 (n=5)	0.0019	**0.9970**	0.0012
Holotype sample *lusatica*, Förstgen 1994.06.19-88 (n=5)	0.3163	0.0107	**0.6730**
Paratype sample *lusatica*, Förstgen 1994.06.19-12 (n=3)	0.3055	0.0134	**0.6811**
Paratype sample *lusatica*, Förstgen 1994.06.19-127 (n=3)	0.2515	0.0059	**0.7426**
Paratype sample *lusatica*, Förstgen 1994.06.19-59 (n=3)	0.1799	0.0117	**0.8084**
Paratype sample *lusatica*, Förstgen 1994.06.19-A1 (n=3)	0.0792	0.0025	**0.9183**
Paratype sample *lusatica*, Förstgen 1994.06.19-94 (n=3)	0.5498	0.0005	**0.4497**

Setting 14: *claraW / cunicularia / persica*

Palaearctic west of 60°E

19 Characters: CS, CL/CW_{1400}, SL/CS_{1400}, PeW/CS_{1400}, EYE/CS_{1400}, $OceD/CS_{1400}$, $MtSt/CS_{1400}$, $MtMtP/CS_{1400}$, $MtMtP/CS_{1400}$, GHL/CS_{1400}, $RipD_{1400}$, $sqPDG_{1400}$, nPn_{1400}, nMN_{1400}, $nPrMe_{1400}$, $nHFfl_{1400}$, nPe_{1400}, $PIGM_{1400}$, $CONT_{1400}$

Number of reference individuals: *clara* 241*, cunicularia* 407, *persica* 86

sample means of wild-card runs:

	p (clarW)	p (cuni)	p (pers)
Syntype sample *clara*, SYR: Damaskus (n=6)	**0.9959**	0.0041	0.0000
Neotype sample *cunicularia*, Fumel 2008.07.25 (n=4)	0.0000	**1.0000**	0.0000
Holotype sample *persica*, IRAN: Tuskestan forest, 200509-517 (n=3)	0.0000	0.0000	**1.0000**

Setting 15: *cunicularia / persica / tianshanica*

Area considered: whole species' range

16 Characters: CS, CL/CW_{1400}, SL/CS_{1400}, PeW/CS_{1400}, EYE/CS_{1400}, $OceD/CS_{1400}$, GHL/CS_{1400}, $RipD_{1400}$, $sqPDG_{1400}$, nPn_{1400}, nMN_{1400}, $nPrMe_{1400}$, $nHFfl_{1400}$, nPe_{1400}, $PIGM_{1400}$, $CONT_{1400}$

Number of reference individuals: *cunicularia* 592, *persica* 86, *tianshanica* 153

sample means of wild-card runs:

	p (cuni)	p (pers)	p (tian)
Neotype sample *cunicularia*, Fumel 2008.07.25 (n=4)	**0.9985**	0.0014	0.0001
Cotype sample *rubescens*, SWI: Vaux (n=4)	**0.9999**	0.0000	0.0001
Holotype sample *fuscoides*, ARM: Byurakan, No 1103 (n=5)	**0.9936**	0.0063	0.0001
Holotype sample *persica*, IRAN: Tuskestan forest, 200509-517 (n=3)	0.0000	**0.9988**	0.0002
Holotype sample *tianshanica*, KIR: Kap Tshigai valley, 1998.07.16 (n=6)	0.0002	0.0000	**0.9998**

Setting 16: *gebaueri / glabridorsis / persica*

Area considered: CHI, IRAN, TUR

10 Characters: CL/CW_{1400}, EYE/CS_{1400}, $OceD/CS_{1400}$, SL/CS_{1400}, PeW/CS_{1400}, GHL/CS_{1400}, $RipD_{1400}$, $sqPDG_{1400}$, $PIGM_{1400}$, $CONT_{1400}$

Number of reference individuals: *gebaueri* 55, *glabridorsis* 38, *persica* 87

sample means of wild-card runs:

	p (geba)	p (glab)	p (pers)
Holotype sample *gebaueri*, CHI: Beishan NP, 1996.05.26 (n=5)	**1.0000**	0.0000	0.0000
Sytype sample *glabridorsis*, CHI: Peking, 1905 (n=2)	0.0000	**1.0000**	0.0000
Holotype sample *persica*, IRAN: Tuskestan forest, 2005.09-517 (n=3)	0.0000	0.0000	**1.0000**