Supplementary Text S2 - Synonymic list of the nominal species and comments on the existing taxonomic names for the *Bombus flavidus* species group.

Bombus norvegicus (Sparre Schneider, 1918). Morphology described in several studies (Yasumatsu, 1939b; Maa, 1948; Løken, 1984; Amiet, 1996; Intoppa *et al.*, 2009; Ødegaard *et al.*, 2015), with additional drawings or photographs in the published literature (Lelej *et al.*, 1995; An *et al.*, 2014; Rasmont *et al.*, 2021). List of existing names as originally proposed:

Psithyrus norvegicus Sparre-Schneider, 1918 described from Norway

Bombus norvegicus subsp. *japonicus* (Yasumatsu, 1939) described as a subspecies from a male from Japan, considered as a subspecies in a later study (Maa, 1948).

Bombus norvegicus subsp. *sachalinus* Maa, 1948 described as a subspecies from a male from Sachalin island (Tomarikishi = Vakhrushev).

Bombus norvegicus subsp. *manchuricus* Maa, 1948 described as a subspecies from a female from north east China (Jilin province).

Bombus norvegicus var. *muelleri* (Popov, 1931) described as a "variety" from males from Germany (valid name as a subspecies, art. 45.6.4 ICZN).

Bombus norvegicus var. *pseudocitrinus* (Popov, 1927) described as a "variety" from males from Transbaicalia (original toponym "Station Gorjatschinskaja"), (valid name as a subspecies, art. 45.6.4 ICZN).

Bombus norvegicus f. *sparreschneideri* (Pittioni, 1939) described as a "form" from Europe, (valid name as a subspecies, art. 45.6.4 ICZN).

Bombus norvegicus f. *subpseudocitrinus* (Pittioni, 1939) described as a "form" from Europe, (valid name as a subspecies, art. 45.6.4 ICZN).

Bombus norvegicus f. *tenebricans* (May, 1944) described as a "form" from Czech Republic, (valid name as a subspecies, art. 45.6.4 ICZN).

Bombus norvegicus var. *transbaicalensis* (Popov, 1927) described as a "variety" from males from Transbaikalia (Tschita=Čita), (valid name as a subspecies, art. 45.6.4 ICZN).

Bombus sichuanicus Biella **sp. nov.**. Morphology described in this study and in Williams et al. (2009).

Bombus sylvestris (Lepeletier, 1832). Morphology described in several studies (Løken, 1984; Amiet, 1996; Ornosa & Ortiz-Sánchez, 2004; Intoppa *et al.*, 2009; Ødegaard *et al.*, 2015), with additional drawings or photographs in the published literature (Rasmont *et al.*, 2021). List of existing names as originally proposed:

Psithyrus quadricolor var. *sylvestris* Lepeletier, 1832 from Europe (valid name as a subspecies, art. 45.6.4 ICZN).

Apathus sylvestris (Thompson, 1872)

Psithyrus quadricolor f. *citrinus* Schmiedeknecht, 1883 described as a "form" from Europe. In fact, this name should be disregarded based on Smith's previous description of a *Psithyrys citrinus* in 1854 (Smith, 1854). To this end, Franklin (1912) proposed a new name, changing from *Psithyrus quadricolor* var. *citrinus* to *Psithyrus quadricolor* var. *confinis* and this latter name should be kept for this form: the updated name is *Bombus sylvestris* var. *confinis* (Franklin 1912) pro *Psithyrus quadricolor* f. *citrinus* Schmiedeknecht, 1883.

Psithyrus quadricolor var. *luctuosus* Hoffer, 1889 described as a "variety" from males of Austria (valid name as a subspecies, art. 45.6.4 ICZN).

Psithyrus sylvestris var. *albicans* Richards, 1928 described as a "variety" from England, Belgium and Norway (valid name as a subspecies, art. 45.6.4 ICZN).

Psithyrus sylvestris var. *atricans* Richards, 1928 described as a "variety" from England (valid name as a subspecies, art. 45.6.4 ICZN).

Psithyrus sylvestris var. *atrithorax* Richards, 1928 described as a "variety" from England and Norway (valid name as a subspecies, art. 45.6.4 ICZN).

Psithyrus sylvestris f. *bimaculatus* May, 1944 described as a "form" from Czech Republic (valid name as a subspecies, art. 45.6.4 ICZN).

Psithyrus sylvestris var. *bradleyi* Richards, 1928 described as a "variety" from England (valid name as a subspecies, art. 45.6.4 ICZN).

Psithyrus sylvestris var. *carelicus* Richards, 1928 described as a "variety" from a male of Finland (valid name as a subspecies, art. 45.6.4 ICZN).

Psithyrus sylvestris f. *citrinocarelicus* May, 1944 described as a "form" from males of Czech Republic (valid name as a subspecies, art. 45.6.4 ICZN).

Psithyrus sylvestris f. *citrinomaculatus* May, 1944 described as a "form" from males of Czech Republic (valid name as a subspecies, art. 45.6.4 ICZN).

Psithyrus sylvestris f. *citrinonigrobasalis* May, 1944 described as a "form" from males of Czech Republic (valid name as a subspecies, art. 45.6.4 ICZN).

Psithyrus sylvestris race *decoloratus* Quilis, 1932 described as a "race" from males of Switzerland (valid name as a subspecies, art. 45.6.4 ICZN).

Psithyrus sylvestris var. *fuscocitrinus* Richards, 1928 described as a "variety" from England (valid name as a subspecies, art. 45.6.4 ICZN).

Psithyrus sylvestris f. *maculatus* May, 1944 described as a "form" from males of Czech Republic (valid name as a subspecies, art. 45.6.4 ICZN).

Psithyrus sylvestris f. *nigrobasalis* May, 1944 described as a "form" from males of Czech Republic (valid name as a subspecies, art. 45.6.4 ICZN).

Psithyrus sylvestris race *pseudoquadricolor* Quilis, 1932 described as a "race" from males of Switzerland (valid name as a subspecies, art. 45.6.4 ICZN).

Psithyrus sylvestris f. *richardsi* Pittioni, 1939 described as a "form" from Europe (valid name as a subspecies, art. 45.6.4 ICZN).

Bombus popovi (Yasumatsu, 1933) **stat. nov.** The morphological description is available from regional studies (Kim and Ito, 1987; Maa, 1948; Yasumatsu, 1939).

Psithyrus sylvestris var. *popovi* Yasumatsu, 1933 from Korea (valid name as a subspecies, art. 45.6.4 ICZN).

Psithyrus sylvestris subsp. *popovi* Yasumatsu, 1939 from Korea.

Bombus flavidus (Eversmann, 1852). Morphology described in previous studies (Løken, 1984; Williams *et al.*, 2014; Ødegaard *et al.*, 2015), with additional drawings or photographs in the published literature (Lelej *et al.*, 1995; Lhomme *et al.*, 2021; Rasmont *et al.*, 2021). List of existing names as originally proposed (excluding names belonging to locations in Alps and Pyrenees):

Psithyrus flavidus (Eversmann, 1852) from a male specimen from the Asian part of Russia

Apathus lissonurus Thomson, 1872 described from Sweden from a female.

Psithyrus flavidus f. *freygessneri* Pittioni, 1939 described as a "form" from Europe under *flavidus* (valid name as a subspecies, art. 45.6.4 ICZN).

Psithyrus flavidus subsp. *frisoni* Popov, 1931 described as a subspecies from females of Kamchatka (valid name as a subspecies, art. 45.6.4 ICZN).

Psithyrus flavidus var. *leucochrous* Popov, 1931 described as a "variety" from a male of east Russia (valid name as a subspecies, art. 45.6.4 ICZN).

Psithyrus flavidus var. *maculinotus* Popov, 1931 described as a "variety" from a female from Siberia (valid name as a subspecies, art. 45.6.4 ICZN).

Psithyrus flavidus f. *thomsoni* Pittioni, 1939 described as a "form" from Europe under *flavidus* (valid name as a subspecies, art. 45.6.4 ICZN).

Psithyrus lissonurus var. *atricolor* Richards, 1928 described as a "variety" from males of Norway (valid name as a subspecies, art. 45.6.4 ICZN).

Psithyrus fernaldae Franklin, 1911 from males and females from northwestern America

Psithyrus tricolor Franklin, 1911from males from northwestern America.

Psithyrus wheeleri Bequaert and Plath, 1925 from males and females from Oregon and California.

Bombus flavidus subsp. *appalachiensis* Lhomme and Hines 2021 described from north-east America.

Psithyrus flavidus flavidus m. *lissonurus* f. *intermedius* Pittioni, 1942 described as a "form" from Europe under the *flavidus* subspecies (North Europe), hence not an available name (art. 45.6.1 ICZN, 1999).

Psithyrus flavidus flavidus m. *flavidus* f. *latofasciatus* Pittioni, 1942 described as a "form" from Europe under the *flavidus* subspecies (North Europe), hence not an available name (art. 45.6.1 ICZN, 1999).

Psithyrus flavidus flavidus m. *lissonurus* f. *superlissonurus* Pittioni, 1942 described as a "form" from Europe under the *flavidus* subspecies (North Europe), hence not an available name (art. 45.6.1 ICZN, 1999).

Note: *Apathus insularis* Cresson, 1863 and *Apathus autumnalis* Zattersted, 1838 are wrongly given as synonyms by Lhomme et al. (2021): in fact, the first name refers to *Bombus insularis* Smith 1854 as indicated by Cresson (1863, page 113); the second one, in the original publication is given as "*B. autumnalis*" (Zetterstedt, 1838, page 474) with author "Fabr." and it is therefore a synonym of *Bombus ruderatus* (Rasmont et al. 2021).

Bombus lutescens **stat. nov.**:

Morphology described in several studies (Amiet, 1996; Ornosa & Ortiz-Sánchez, 2004; Intoppa *et al.*, 2009). List of existing names as originally proposed:

Psithyrus quadricolor var. *lutescens* Pérez, 1890 (nec *Bombus masctrucatus* var. *lutescens* Friese and Wagner, 1910 nec *Bombus latissimus* var. *lutescens* Friese, 1918, nec *Bombus ruderarius* race *lutescens* Krüger, 1939). Pérez used "*lutescens*" before the other authors and hence *Psithyrus quadricolor* var. *lutescens* Pérez, 1890 has priority (art. 23 ICZN, 1999). Originally, it was described as a "variety" from males of Pyrenees (France) without an explicit indication that it was intended as an infrasubspecific entity, that makes the name available (art. 45.6.4 ICZN, 1999); however, it was later considered as a "form" of the *alpium* subspecies (Pittioni, 1942), but later reinstated as subspecies with the name *Bombus flavidus* subsp. *lutescens* (Pérez, 1890) (Rasmont, 1983): therefore we deem it as an available name because it was used as subspecies before 1985 (art. 45.6.4.1 ICZN, 1999).

Psithyrus lissonurus var. *alpium* Richards, 1928 described as a "variety" from Switzerland without an explicit indication that it was intended as an infrasubspecific entity and later it was elevated as a subspecies (Pittioni, 1942) (valid name as a subspecies, art. 45.6.4 ICZN).

Psithyrus flavidus m. *alpium* f. *freygessneri* Pittioni, 1939 described as a "form" from Europe under the *alpium* (hence Alps or Pyrenees), hence not an available name (art. 45.6.1 ICZN, 1999).

Psithyrus flavidus alpium f. *analirufescens* Pittioni, 1942 described as a "form" from Europe under *alpium* subspecies (hence Alps or Pyrenees), hence not an available name (art. 45.6.1 ICZN, 1999).

Psithyrus flavidus alpium f. *paradoxus* Pittioni, 1942 described as a "form" from Europe under *alpium* subspecies (hence Alps or Pyrenees), hence not an available name (art. 45.6.1 ICZN, 1999).

Psithyrus flavidus alpium m. *alpium* f. *latofasciatus* Pittioni, 1942 described as a "form" from Europe under *alpium* subspecies (hence Alps or Pyrenees), hence not an available name (art. 45.6.1 ICZN, 1999).

Psithyrus flavidus alpium f. *quasiquadricolor* Pittioni, 1942 described as a "form" from Europe under *alpium* subspecies (hence Alps or Pyrenees), hence not an available name (art. 45.6.1 ICZN, 1999).

Psithyrus flavidus alpium f. *rufiolutescens* Pittioni, 1942 described as a "form" from Europe under *alpium* subspecies (hence Alps or Pyrenees), hence not an available name (art. 45.6.1 ICZN, 1999).

Psithyrus flavidus alpium f. *thomsoniformis* Pittioni, 1942 described as a "form" from Europe under *alpium* subspecies (hence Alps or Pyrenees), hence not an available name (art. 45.6.1 ICZN, 1999).

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