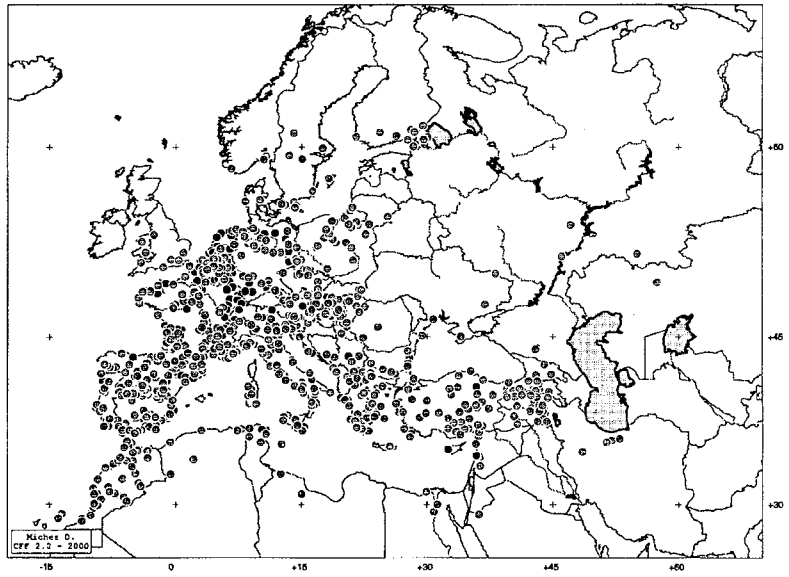

Figure 1. *Dasypoda* distribution in West-Palaearctic

West-Palaearctic *Dasypoda* LATREILLE, 1802 biogeography (Apoidea, Melittidae)

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Dasypoda LATREILLE, 1802 is one of the most diversified amongst the 14 known Melittidae genera. *Dasypoda* is endemic in Palaearctic region where it extends from Wales to Japan and from Canaries Isles to Finland. A recent study counts 20 species in the West-Palaearctic area (MICHEZ, 2002). Most of them are concentrated around the Mediterranean basin. In present work, in view to understand the West-Palaearctic *Dasypoda* origin and expansion modes, authors synthesise the biogeographic information available through literature and museums collections (Fig. 1). Each species dispersal was studied on maps and four biogeographic species groups were defined on basis on their dispersal characteristics.

The first of these four groups includes three species, *D. albipila* SPINOLA, 1838, *D. brevicornis* PEREZ, 1895 and D. maura PEREZ, 1895, distributed Southern the Mediterranean Basin. *D. albipila* is oriental, distributed in Egypt and Arabia. The two others are strictly North African.

The second group includes the typical Iberian species. *D. iberica* WARNCKE, 1973 and *D. morotei* are endemic in the Iberian Peninsula. On the contrary, *D. albimana* PEREZ, 1895, *D. cingulata* ERICHSON, 1835, *D. crassicornis* FRIESE, 1896 and *D. dusmeti* QUILIS, 1928 are quite more abundant in Spain and Portugal but were also observed in close areas of France and Morocco.

The third group is constituted by species of which dispersal is restricted to the Mediterranean Basin Eastern part. Three distributions kinds can be identified among this third group. *D. frieseana* SCHLETTERER 1890, *D. patinyi* MICHEZ, 2002, *D. pyriformis* RADOSZKOWSKI, 1887 and *D. suripes* (CHRIST, 1791) are characterised by a distribution centred on Greece, Balkans, West-Turkey and North-West Syria. On the opposite, *D. braccata* EVERSMANN, 1852 and *D. spinigera* KOHL, 1905 display a pontic range. While, *D. longigena* SCHLETTERER, 1890 is endemic in Eastern Turkey.

The other *Dasypoda* species are present in more than one of the previously described areas. *D. argentata* PANZER, 1809 displays an European range, Eastern extended to Caucasus and Iran. WARNCKE (1973) described a *D. argentata* subspecies endemic in Spain: *D. argentata hispanica*. It appears, after morphological analysis, that several other subspecies have to be described in *D. argentata*. For instance, the Turkish populations constitute a subspecies already described by RADOSZKOWSKI (1890). The second species, *D. hirtipes* FABRICIUS 1793, is widely distributed in the whole West-Palaearctic. Six subspecies were described in this latter species (WARNCKE 1973). *D. hirtipes hirtipes* is present in the whole Europe. Three subspecies coexist in North-Africa: *D. hirtipes canariensis* WARNCKE, 1973, *D. hirtipes oraniensis* PEREZ, 1895 and *D. hirtipes panzeri* SPINOLA, 1838. The two others *D. hirtipes* taxa are distributed in Caucasus, *D. hirtipes minor* MORAWITZ, 1874, and Balkans, *D. hirtipes graeca* LEPELETIER, 1825. An other species, *D. pyrotrichia* FORSTER, 1855 presents a notable range disjunction. Three *D. pyrotrichia* subspecies were described. Each is distributed in particular small area close to one of the Quaternary European glaciation refuge. *D. pyrotrichia eatoni* SAUNDERS, 1881 is Spanish, *D. pyrotrichia nigra* WARNCKE, 1973 is Greek and the nominal subspecies is Turkish. Finaly, the fourth species of this last group, *D. visnaga* (ROSSI, 1790), displays a typical Mediterranean distribution without any obvious polarity.

Through comparison of the previous distributions, it appears that among *Dasypoda*, as by numerous other Apoidea groups, two main diversity centres exist Eastern and Western Mediterranean Basin. These centres correspond apparently to the studied taxa's glaciation refuge.

This global scheme can be detailled and 5 *Dasypoda* richness areas can be identified in West-Palaearctic: Balkans (including Greece), Caucasus, Spain, North-Africa and Turkey. These areas were mapped, indicating for each European country the Dasypoda species amount in its fauna (Fig. 2). The obtained map displays that the latter areas are grooped into two main diversity centres. The first one is Spanish and the second Balkanic. Contrary to what was observed by Melittinae, *Dasypoda* doesn't display any Asiatic diversity area (MICHEZ 2001).

Spain constitutes thus one of the two main *Dasypoda* richness areas. The endemism and diversity rates decrease strongly in the neighbouring regions: Portugal and France. Ten species are known in Spain and only one is endemic: *D. iberica*. On the other hand, 8 species are distributed in France (none is endemic) and only *D. hirtipes* exists in Belgium. Eight species are distributed in North-Africa. Two are endemic in this area. The North African endemism rate is thus higher than the Spanish. Like it was observed in Europe, this rate decrease strongly in the neighbouring areas.

On the other hand, the Turkish fauna is rich but displays only one endemic species: *D. longigena*. Most of the Turkish *Dasypoda* seems to origin from Greece and Balkans.
Considering the detailed particularities of the *Dasypoda* distributions, it is obvious that these bees are more thermophilous than other Melittidae like Melittinae. For instance, *Dasypoda* and *Melitta* display the same richness areas in Europe, Spain and Balkans, both characterized by their own typical fauna. Nevertheless, inside these Mediterrean Peninsulas, the observed diversity gradients are stronger by *Melitta* and *Macropis*.

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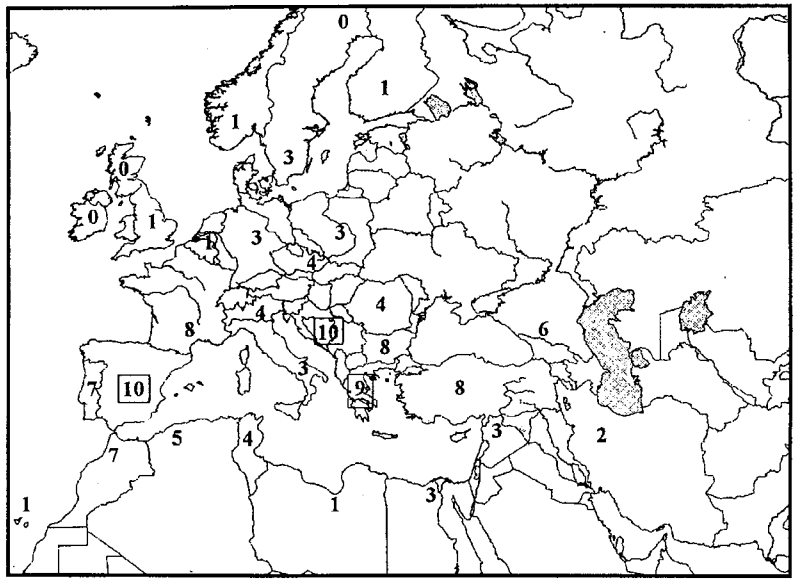

Figure 2. *Dasypoda* diversity in West-Palaearctic.

Populationsgenetische Untersuchungen an Aggregationen der Weidensandbiene *Andrena vaga* Panzer, 1799 (Apoidea, Andrenidae)

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Im Gegensatz zur oft untersuchten Honigbiene *Apis mellifera* gibt es bisher kaum Forschung zur populationsgenetischen Struktur von Wildbienen. Aus diesem Grund untersuchten wir die Populationsstruktur der solitären Sandbienen-Art *Andrena vaga*. Die Wildbienen nisten in Baden-Württemberg schwerpunktmäßig im Rheintal, in mehr oder weniger großen Aggregationen von bis zu 15.000 Nestern in der Nähe von Silberweiden-Beständen. Die Abstände zwischen den sieben untersuchten Aggregationen variierten von wenigen hundert Metern bis zu 75 Kilometern.
Wir entwickelten über 20 Mikrosatelliten-Loci speziell für *A. vaga*, von denen 14 für die Datenauswertung herangezogen wurden, da sie sehr verlässliche Daten lieferten und hochvariabel waren. Sie wiesen zwischen 7 und 18 Allele auf, und die beobachtete Heterozygosität lag zwischen 0,16 und 0,86.
Der Inzuchtkoeffizient F_{is} war signifikant positiv über alle Loci und Aggregationen (zwischen +0,18 und +2,7) was wahrscheinlich auf Paarungen zwischen nah verwandten Tieren zurückzuführen ist. Ein Test auf genotypische Differenzierung zwischen den einzelnen Aggregationen ergab statistisch signifikante Unterschiede bei fast allen Populations-Paaren. Eine im Enztal gelegene Aggregation unterschied sich hochsignifikant von den übrigen, im Rheintal gelegenen Untersuchungsgebieten. Trotz statistisch signifikanter Unterschiede waren F_{st}- und R_{st}-Werte zwischen den einzelnen Populationen durchweg sehr klein (< 0,1), d.h. die genetischen Distanzen zwischen ihnen sehr gering. Die Daten lassen auf einen hohen Genfluss v.a. zwischen den in der Rheinebene gelegenen Aggregationen schließen. Zur Untersuchung der Feinstrukturierung innerhalb einer Nestaggregation wurde die Entfernung der einzelnen Nester zueinander in die Auswertung der genetischen Daten mit einbezogen.