Supplementary Data Table S3: Definition of the geographical regions for the AAR analyses

Number, composition and boundaries of the geographic regions followed certain parameters and requirements:

The number of regions should be as large as possible, to receive results with the best possible resolution for ancestral area states. However, the regions should be reasonable in size and the number of affiliated species should be more or less equally distributed over all regions, whereas the maximal number of discrete geographic units was restricted to 15 by the limitation of the RASP software (Yu et al., 2011). Moreover, the single geographic regions should include a high number of species which are endemic to that region, and only some widely distributed species should occur in more than two or three regions.

The regions were roughly orientated on terrestrial ecozones and their actual outline and boundaries followed largely the major habitat types (MHT) / ecoregions of the WWF ecoregions 200 map (Olson et al., 2001). In some cases this coincided with the outline of major mountain ranges (e.g., regions G, H and I). In some cases regions were adjusted, in order to include the whole distribution range of a species or to avoid the affiliation of a species to a certain region, when it only occurs in a small fringe of that area.

Finally, regions were only applied for areas, in which Arabideae species actually do occur. We did not include very rare outpost occurences (like an *Arabis alpina* specimen from the East Sayan mountains) or occurrences based on recent human introduction (e.g., naturalized ornamentals like *Arabis procurrens* or *Aubrieta deltoidea* in some parts of the USA, see Al-Shehbaz, 2009).

Finally, 14 geographical regions were defined:
Region A: North and Central America
Region B: South America
Both regions follow the phylogeographic regions created for the *Draba* phylogeography of Ingrid Jordon-Thaden (2010), as the majority of Arabideae species from these regions are members of *Draba* and its segregates. Distribution areas of other Arabideae species, which occur there, are covered by the outline of the respective region.
Region C: Iberian Peninsula & North Western Africa
This region includes all mediterranean, montane and alpine areas of North West Africa and all parts of the Iberian peninsula south of the Pyrenees. However, a small part of North eastern

Spain and the Balearic Islands were included to region E, as none of region C endemics occur there, but *Arabis collina* has there westernmost occurences there.

Region D: Central Mediterranean & Southern Balkan

This region comprises Italy south of the Alps, the Greek/Albanian/Macedonian mountain ranges (e.g., Pindhos, Pierian Mountains, Šar Planina). Moreover, it includes Corsica, the Balearic Islands and the mediterranean scrub MHT (Olson et al., 2001) of France and Greece.

Region E: Europe

This region comprises all remaining parts of Europe, including the mountain ranges of the Pyrenees, Alps and Carpathians. The border between Europe and Asia (i.e. the border between regions D and F in the Aegean Sea and the border between regions E and L along the Ural mountains) follows the Flora Europaea (Tutin et al., 1993).

Region F: Western and Central Anatolia & Levantine coast

Region G: Caucasus, Eastern Anatolia & Iranian mountain ranges

Besides Cyprus and the Mediterranean areas of the Levant, region F includes the Asian part of Turkey with Central Anatolia, the Pontic mountains and the Western and Central Taurus mountain ranges. The neighboring region G begins at the mountains of the Anatolian diagonal and the Caucasus and then spawns eastwards to the mountain ranges of the Iranian plateau (e.g., Elburs, Kopet Dag, Zagros).

Region H: high mountains of the Arabian Peninsula and Eastern Africa

Region I: Central Asian mountain ranges

This region includes all major Central Asian mountain ranges like Sayan mountains., Altai, Tian Shan, Pamir, Alai, Hindu Kush and Kirthar plus the Western part of the Himalaya (i.e. all parts west of Nepal).

Region J: Eastern Himalaya and Tibet-Chinese mountains

All eastern parts of the Himalaya are included in this region, which additionally comprises the Qinghai-Tibetian plateau and Chinese mountains like the Qilin mountains., Helan Shan and Hengduan Shan.

Region K: Eastern Asia

This region includes all temperate areas east of region J in Eastern Asia plus the subtropical Chinese ecoregion 'Jian Nan subtropical coniferous forests' (Olson et al., 2001). As a result it spawns across Eastern China, the Southern parts of the Russian Far East, the Korean Peninsula, Japan and Taiwan.

Region L: Siberia & Russian Far East

This region comprises the Siberian and Transbaikal taiga areas as well as the arctic areas of Asia (including Beringia).

While defining these regions we turned our main attention to *Arabis* and genera like *Baimashania*, *Borodiniopsis* and *Scapiarabis*, as they comprise the most basal taxa within the Arabideae. In general, the resulting pattern of defined geographic regions does also fit well for the other genera. Only the circumarctic *Draba* species (which, however, are fairly derived) are not represented optimally with this pattern, as they had to be affiliated to multiple regions though only occurring in small parts of these regions. However, alternatives like including arctic Europe to region A or defining an extra circumarctic region would have caused problems for other, more basal, species and were therefore declined.

Cited literature:

Al-Shehbaz IA. 2009. Brassicaceae. In: Flora of North America Editorial Committee, ed. *Flora of North America*, vol. 7. New York, NY: Oxford University Press, 224-746.

Jordon-Thaden I. 2010. *Species and Genetic Diversity of Draba: Phylogeny and Phylogeography*. PhD thesis, Ruperto-Carola University of Heidelberg, Germany.

Olson DM, Dinerstein E, Wikramanayake ED, *et al.* 2001. Terrestrial ecoregions of the world: a new map of life on earth. *BioScience* **51**: 933-938.

Tutin TG, Burgess NA, Chater AO, *et al.* 1993. Flora europaea, 2nd ed., vol. 1. Cambridge, Cambridge University Press.

Yu Y, Harris AJ, He XJ. 2011. RASP (Reconstruct Ancestral State in Phylogenies) 2.0 beta. Available at http://mnh.scu.edu.cn/soft/blog/RASP