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HYBRID MATINGS BETWEEN THE INVASIVE PEST SLUG *ARION LUSITANICUS* AND THE NATIVE *A. RUFUS*

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Within the last century, the Iberian slug *Arion lusitanicus* has immigrated into most European countries (Wiktor 2004) and become an important agricultural and horticultural pest. The distribution range is still expanding, and in 2008 *A. lusitanicus* was found in Latvia for the first time. Besides the ecomomic damage, it is important to know the potential influence this invasive slug has on the native fauna. It has been observed repeatedly that the native, and externally very similar, slug *Arion rufus* disappears at sites where *A. lusitanicus* has established strong populations although systematic studies on this have still to be published. The observation of morphological intermediates has lead to the assumption that *A. lusitanicus* hybridises with the northern *A. ater* (Hagnell et al. 2003, von Proschwitz pers. comm.). Long term observations by Reise and colleagues of the immigration process in the surroundings of Görlitz, SE Germany, have also produced strong morphological evidence of regular hybridisation between *A. lusitanicus* and *A. rufus*. However, it has never been proven that *A. lusitanicus* does really mate successfully with *A. rufus* or *A. ater*. Considering the rather big differences in shape, size and positioning of those parts of the distal genitalia everted and interacting during copulation, it seems hard to believe that mixed couples proceed beyond initial courtship and manage to transfer sperm. Our study investigated this issue. In autumn 2010, 72 mature and subadult slugs (36 *A. lusitanicus* and 36 *A.* rufus) were collected in the surroundings of Görlitz and mating trials involving three different combinations of partners were set up in the laboratory: two *A. rufus*, or two *A. lusitanicus*, or mixed couples. All matings were video recorded, and some couples were killed during or shortly after copulation to study the anatomy during mating and whether spermatophores were transferred (6 couples of *A. rufus*, 6 couples of *A. lusitanicus* and 3 mixed couples). Of the186 couples set up over 16 occasions (40 *rufus*/*rufus*, 39 *lusitanicus*/*lusitanicus*, 107 mixed) 59% showed some kind of mating behaviour (85% *rufus*/*rufus*, 49% *lusitanicus*/*lusitanicus*, 53% mixed). So in mixed couples at least one partner showed interest in mating similarly often as in couples of *lusitanicus*. The pattern is not very different when considering couples in which both partners everted their distal genitalia (i.e. they took up the mating position) for at least 30 minutes: 42% *rufus*/*rufus*, 28% *lusitanicus*/*lusitanicus*, 21% mixed. However, a considerably higher percentage of mixed couples broke off mating prematurely. Nevertheless 5 mixed couples (5%) showed full mating behaviour, compared to 30% in *rufus*/*rufus* and 26% in *lusitanicus*/*lusitanicus* couples.Of these 5 mixed couples which had mated, at least three successfully exchanged spermatophores and one did not. The anatomical study of slugs killed during or shortly after copulation allowed us to understand how spermatophore exchange in both directions is possible in mixed couples even though their everted distal genitals are so different. Our study thus establishes that *A. rufus* and *A. lusitanicus* indeed not only try to mate but also manage to exchange sperm in both directions, although intraspecific pairs are more often successful. Our next aim is to investigate whether mixed matings can produce hybrid offspring, and whether these are fertile.

References

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