Quantifying diversity in male reproductive senescence patterns in mammals

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Résumé

Female reproductive senescence – the decline in female's reproductive performance with increasing age - has been repeatidly described in mammals. The picture is quite different from males as paternity assignment is much less straightforward and requires molecular analyses. A comprehensive view of the occurrence and magnitude of male reproductive senescence across the tree of life is yet to be established, and its possible evolutionary and ecological drivers remain to be identified. Using a standardised literature search protocol (PRISMA method) of age-specific mating success and reproductive success data, we were able to compiled information on 56 species, encompassing 72 populations. We detected male reproductive senescence in 56% of the species studied, indicating that reproductive senescence occurs in at least half of the studied species. Interestingly, the likelihood to detect reproductive senescence increases with the sample size, as well as the lifespan coverage (age range studied relative to longevity), suggesting that in many case reproductive senescence is likely to be underestimated. We subsequently investigated how evolutionary factors influence the patterns of male reproductive senescence, characterized by both the onset and the rate/strength of senescence. We demonstrated that the onset of reproductive senescence is influenced by the position of species on the slow-fast gradient, with slower species exhibiting later senescence than faster species, as observed in females. However, surprisingly, the rate of senescence does not appear to vary according to the pace of life of the studied species. Finally, we showed that the level of sexual competition does not seem to impact either the onset or the rate of male reproductive senescence. This was investigated by considering both pre-copulatory competition proxies (mating system, sexual size dimorphism) and post-copulatory proxies (relative testes size).

Mots-Clés: male ageing, reproductive senescence, mating success, reproductive success

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