A female lek mating system in the worm pipefish (Nerophis lumbriciformis)

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Lek mating systems, in which one sex gathers to display at a well-defined spatial location and the other arrives for the sole purpose of choosing a mate, remain an enduring puzzle for sexual selection theory. The most perplexing aspect of this mating system is embodied by the “paradox of the lek”: in the face of the strong directional selection imposed by mate choice, genetic variation among competing individuals should rapidly disappear, thus negating any benefit for the choosing sex. Here, we show that a marine pipefish, Nerophis lumbriciformis, has an extremely unusual mating system characterized by lekking females. Males, who provide all post-zygotic care to ventrally attached offspring, visit the lek and mate with the most attractive females. In this sex-role-reversed lek, the direct benefits to males are more obvious than in traditional systems as they receive fuller broods of larger eggs when mating with the most ornamented lekking females. Female display traits honestly reflect their reproductive potential, as ornaments are costly to maintain and expressed in a condition-dependent manner. Indirect selection on mating preferences is not necessary to explain the establishment and maintenance of the worm pipefish mating system, so the paradox of the lek appears not to apply to this species. Similar, but subtler, mechanisms could contribute to the maintenance of leks in species with "conventional" sex roles.

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