

## Incompatibility and Reproductive Output in Distylous *Psychotria boninensis* (*Rubiaceae*), Endemic to the Bonin (Ogasawara) Islands, Japan

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*Psychotria boninensis* (*Rubiaceae*), endemic to the Bonin Islands, Japan, is distylous in floral morphology, but uncertainty remains as to whether the two morphs of the species have self- and intramorph incompatibility system and if they are functionally distylous. We examined self- and intramorph incompatibility and reproductive output in natural population of the species. Pollination experiments indicated that this species presents incompatibility preventing self- and intramorph fertilizations. Fruit set percentage of the L-styled morph flowers was significantly greater than that of the S-styled morph flowers in artificial cross-pollination as well as in open pollination. These results indicate that *P. boninensis* functionally maintains a distylous breeding system in the Bonin Islands and also suggest that the female reproductive potential of the S-styled morph flowers may decline functionally, despite the fact that reciprocal pollen flows occur between the two morphs.

**Key words:** Bonin (Ogasawara) Islands, breeding system, distyly, incompatibility, pollination experiment, *Psychotria boninensis*, *Rubiaceae*.

Distyly is a genetic floral dimorphism in which plant populations are composed of long (L)-styled and short (S)-styled morphs, and their flowers usually have self- and intramorph incompatibility (Ganders 1979, Barrett 1992, Naiki 2012). However, it is also known in some species that despite the distylous floral nature their flowers have self- and intramorph compatibility (Bawa and Beach 1983, Riveros et al. 1995, Barrett et al. 2000). Therefore, in

order to assess the reproductive nature of distyly, it is important to clarify the incompatibility system of the two morphs in self- and intramorph pollination.

*Psychotria* L. (*Rubiaceae*) is a large woody genus containing more than 1800 species and widely occurs in tropical to subtropical regions of the world (Mabberley 2008). In Japan, there are five *Psychotria* species. Among them, *Psychotria boninensis* Nakai is a perennial liana

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菅原 敬<sup>a</sup>, 湯本真由美<sup>b</sup>, 常木静河<sup>c</sup>, 渡邊謙太<sup>d</sup>: 小笠原諸島固有の二型花柱性植物オオシラタマカズラ (アカネ科) における不和合性と果実形成率

小笠原諸島固有種であるオオシラタマカズラ *Psychotria boninensis* Nakai は、長花柱花と短花柱花をもつ二型花柱性の植物であることが最近確認された。しかし、この種が二型花柱性の重要な特徴である自家・同型花不和合性をもつのかどうかについては不明であった。ボチョウジ属や二型花柱性を示す他属の一部の種ではこの特性を欠く例も報告されている。本研究では自家・同型花不和合性の有無を交配実験で確認するとともに、野外における二型の花の果実・種子形成の割合を調べた。二型の花は自家授粉、同型他家授粉のいずれにおいても結実がみられないが、異型花間では結実することから、この種は典型的な二型花柱性の植物であることがわかった。果実あたりの種子形成率において、二型花間

に違いはみられなかったが、これは一つの果実に最大2個の種子しか形成されないためと考えられる。花あたりの結実率を異型花間の人工授粉において調べてみると、長花柱花の結実が短花柱花よりも有意に高く、野外で調べても同様の傾向が得られた。したがって、短花柱花はその柱頭へ花粉が運ばれにくい傾向にあるのではなく、雌機能それ自体が低下していることが考えられる。

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