Title: Sex expression, population structure, and floral dimorphism in a gynodioecious herb, *Agastache rugosa* (Lamiaceae) in Korea

Author: Tae-Soo Jang Hye-Kyoung Moon Suk-Pyo Hong

PII: S0367-2530(15)00060-2
DOI: http://dx.doi.org/doi:10.1016/j.flora.2015.06.004
Reference: FLORA 50863

To appear in:

Received date: 3-3-2015
Revised date: 18-6-2015
Accepted date: 25-6-2015

Please cite this article as: Jang, Tae-Soo, Moon, Hye-Kyoung, Hong, Suk-Pyo, Sex expression, population structure, and floral dimorphism in a gynodioecious herb, Agastache rugosa (Lamiaceae) in Korea.Flora http://dx.doi.org/10.1016/j.flora.2015.06.004

Sex expression, population structure, and floral dimorphism in a gynodioecious herb, *Agastache rugosa* (Lamiaceae) in Korea

Author Names: **Tae-Soo Jang · Hye-Kyoung Moon · Suk-Pyo Hong***

Laboratory of Plant Systematics, Department of Biology, Institute of Basic Sciences, Kyung Hee University, Seoul, 130-701, Korea

*Author for Correspondence; TEL: +82 2 961 0842, FAX: +82 2 961 9155

E-mail: sphong@khu.ac.kr (S.-P. Hong)

Running title: Breeding system of *Agastache rugosa* (Lamiaceae)

Highlights

▶ *Agastache rugosa* was characterized as a gynodioecious species. ▶ Floral dimorphism was clearly exhibited in *A. rugosa*. ▶ Different functional or non-functional male organs were compared. ▶ Male sterility in *A. rugosa* could play an important role in maintaining a high out-crossing rate in natural populations. ▶ We present the first comprehensive micromorphological and embryological data of *A. rugosa*.

Abstract We investigated phenotypic expression and floral dimorphism in *Agastache rugosa*, a gynodioecious perennial herb, in five Korean populations. Three phenotypes, based on their reproductive characteristics, were found: plants with hermaphrodite flowers (male fertile); plants with female flowers (male sterile); and an intermediate phenotype, which had both hermaphrodite and female flowers within the same inflorescence. Most populations consisted of hermaphrodite and female individuals, together with the intermediate phenotype. Floral dimorphisms were found in nearly all the organs studied, including the corolla, calyx, and stamen, but not between the gynoecium of hermaphrodite and female flowers. Hermaphrodite flowers always had larger floral parts than those of the female and intermediate phenotype. Although there were no significant nutlet size differences between sexual types, nutlet weight was consistently greater in females than in hermaphrodites. Hermaphrodite flowers possessed a high proportion of fertile pollen grains, whereas in the