

B12 - Reproductive strategies of weedy flowering plants in tropical rainforest transformation systems, Sumatra, Indonesia



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Background

The understory of tropical rainforest transformation systems is strongly colonized by herbaceous invasive plants. We are interested in the mode of reproduction as a factor for invasiveness and abundance of plant species.

Hypotheses

- **Apomixis**, the asexual reproduction via seed, occurs frequently in invasive species.
- Apomixis provides **reproductive assurance** without the need of pollinators or mating partners and consequently is an efficient strategy for founding populations (Baker's law; Baker 1967).
- Apomixis results in **clonality**, while sexuality maintains **genetic diversity**.

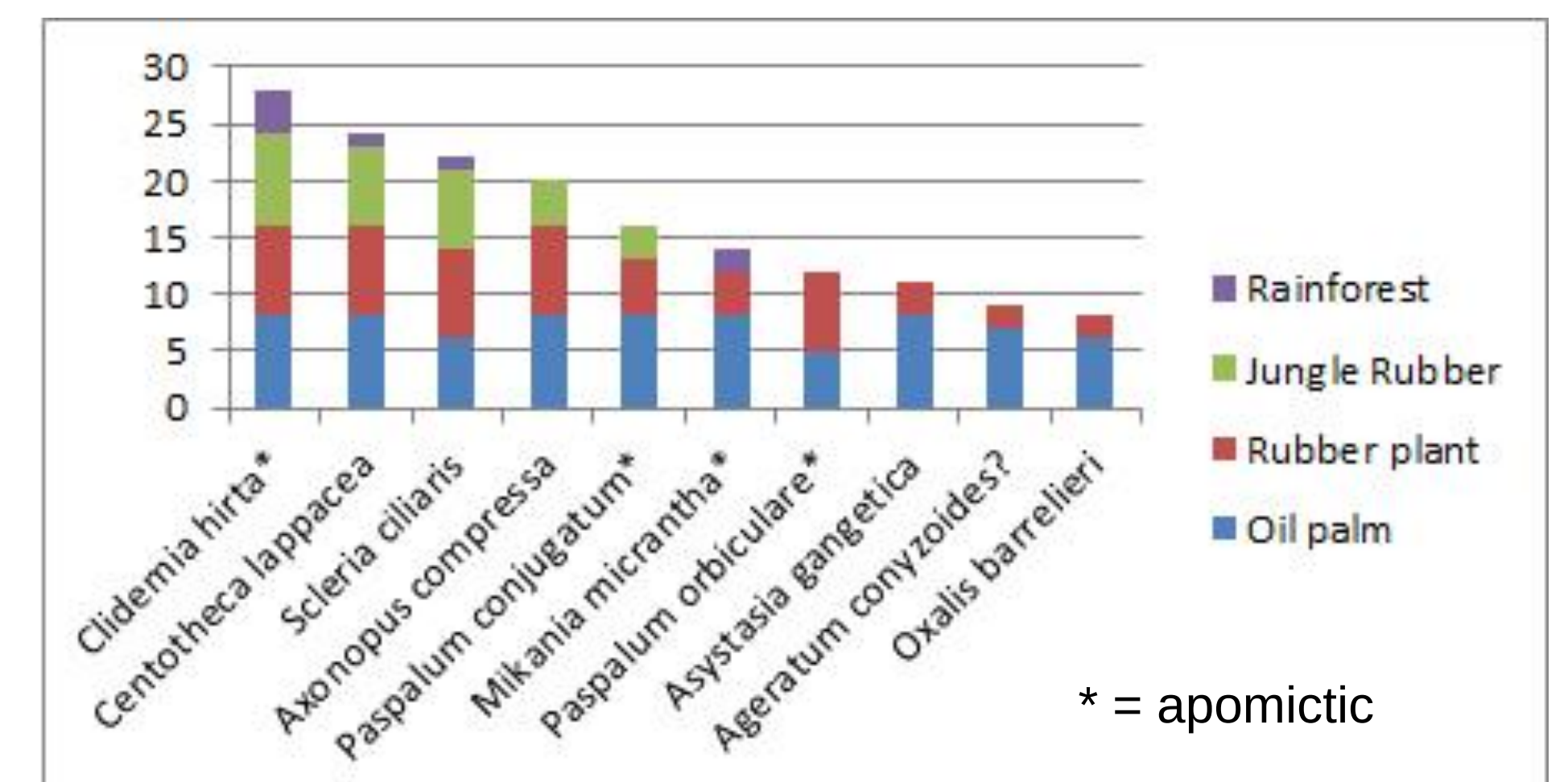
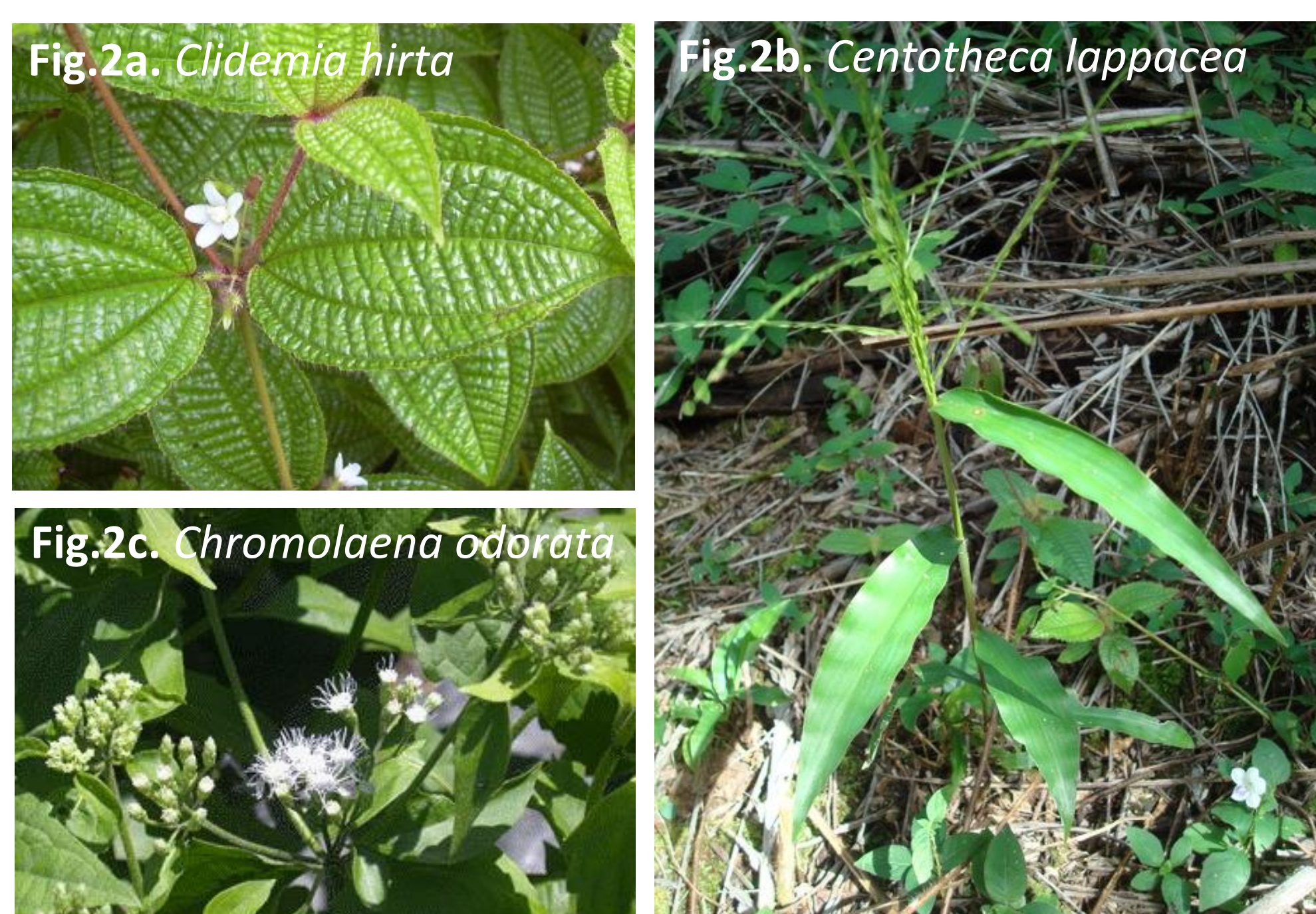


Fig.1. Plot occurrences of the ten most abundant herbs. * = apomictic



Methods

We identified the ten most abundant invasive species in the land-use systems (coll. with B06; Fig.1). In *Clidemia hirta* (Fig.2a) we used pollen exclusion tests, germination rates and seven microsatellite loci. In the grass *Centotheca lappacea* (Fig.2b), we used histological studies (GBIF Portal), flow cytometric seed screening (FCSS), and Amplified Fragment Length Polymorphisms (AFLPs; incl. data from B03). FCSS was also started for *Paspalum* spp. and *Axonopus*. For the Asteraceae *Mikania micrantha* and *Chromolaena odorata* (Fig.2c), microsatellite work was started (Rahayu in prep.)

Results

- **Four** of the „top ten“ invasive species are apomictic (Fig.1), an unexpected high proportion (c. 2% of genera have apomixis, Hojsgaard et al. 2014).
- *Clidemia hirta* shows pollen-independent (autonomous) apomixis, polyembryony, clonality and lack of genetic substructure (Fig.3; Opfermann et al. in prep.).
- *Centotheca lappacea* is a diploid sexual, wind-pollinated outcrosser with high genotypic diversity. The five genetic clusters show high admixture, but almost no differentiation within and among landscapes / systems (Fig.4; Ulu, 2014; Hodač et al. subm.).

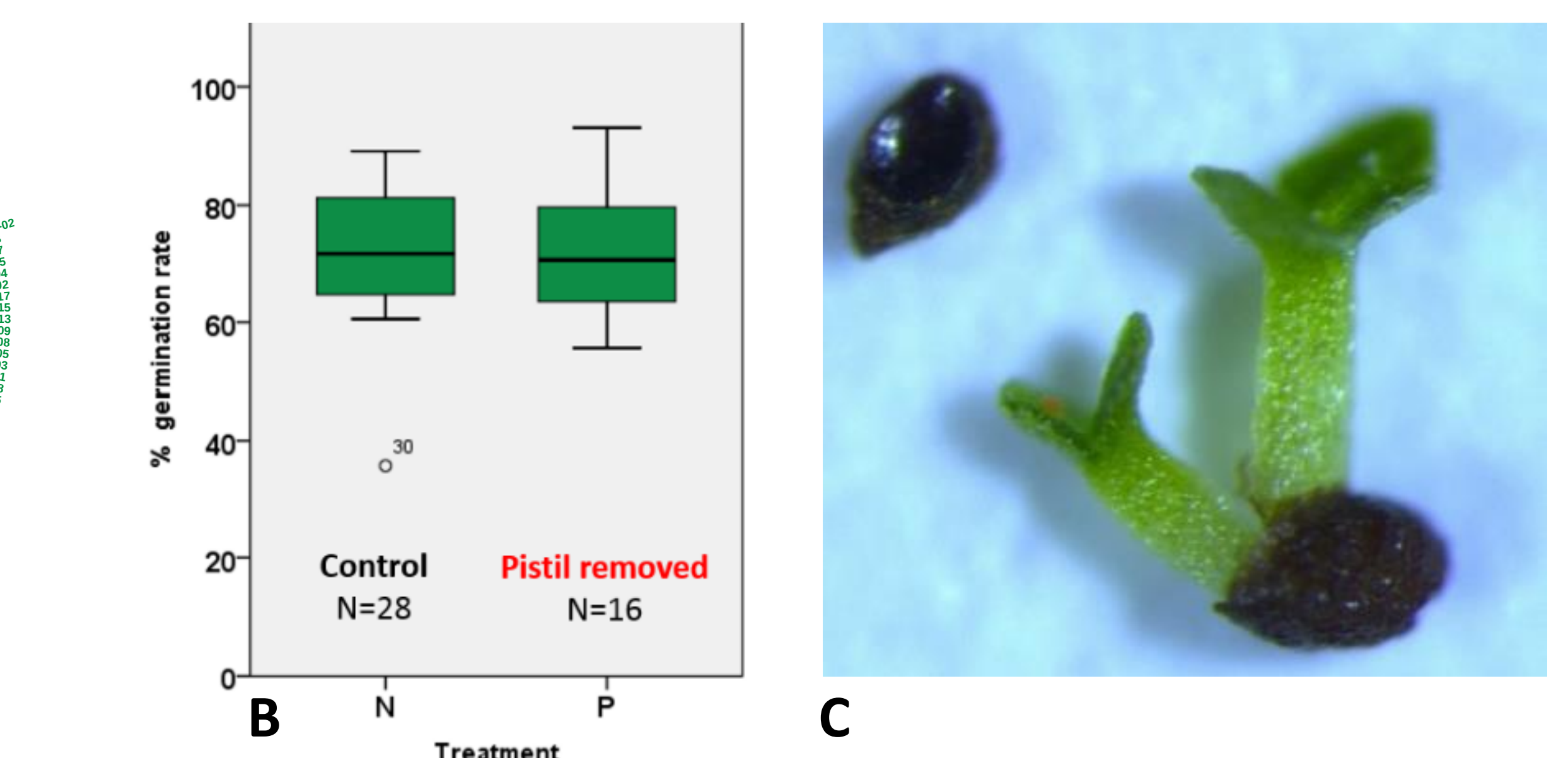
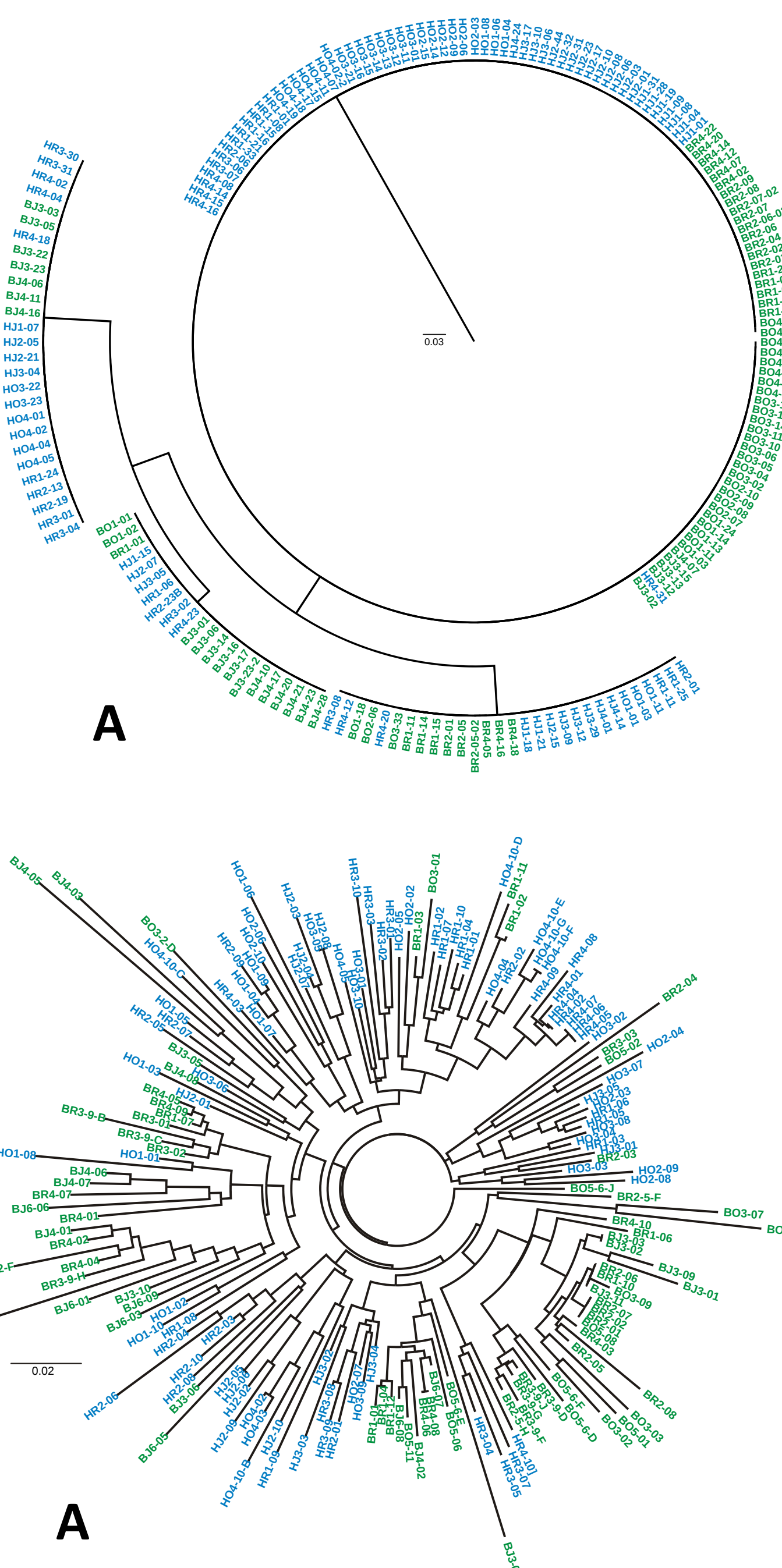


Fig.3. *Clidemia hirta*. A) Neighbor Joining tree of three microsatellite loci; B) germination rates after pistil removal (P) and control (N); C) polyembryony.

Summary

At least four of the ten most abundant alien species reproduce via **apomixis**. Pollinator-independence is probably an important positive factor for rapid colonization. Population genetic diversity is in apomictic *Clidemia hirta* strongly reduced, while the sexual outcrossing grass *Centotheca lappacea* shows a high genetic diversity and admixture across landscapes/systems. Mode of reproduction has a strong influence on population genetic structure, but invasiveness is not depending on genetic diversity.

Acknowledgments

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