Foreword

The invasion of the shrub, *Piper aduncum* or bamboo piper, is having major ecological, economic, sociological, nutrient, and botanical impacts in Papua New Guinea. The author, Alfred Hartemink, is an outstanding soil scientist and ecologist and who has spent 10 years investigating the impact of this invasive plant on the natural environment and economy of Papua New Guinea.

Piper aduncum was introduced many years ago onto the island from South America as well as many other regions of the world, including Florida. It is a related bamboo species and has some value as a traditional medicine and other agroforestry benefits, like biomass fuel. The shrub or small tree grows rapidly under favorable conditions. For example, in the humid lowlands of Papua New Guinea, the shrub produced an average of 24 tons of biomass in nearly one year.

After New Guinea farmers remove the primary forest growth, plant their crops for two or three years, and then abandon the land, *Piper aduncum*, invades the land, completely dominates all the vegetation, and becomes a thicket. As Hartemink reports, the growing bamboo piper rapidly removes fertilizer nutrients, including nitrogen, phosphorus, and potassium from the soil. This invasive bamboo piper does provide fuel biomass for the rural people, as well as rapid cover over the land to protect it from soil erosion. Although *Piper aduncum* has some value in agroforesty, it is generally considered an invasive weedy shrub or tree.

In general, invasive species of plants, animals, and microbes are second only to the environmental impacts of human populations on earth, and generally considered more serious than the problem of global warming. Invasive plants, such as bamboo piper, cause major ecological and economic impacts in the U.S. and elsewhere in the world. Invasive plants may displace native plants by various means, including competition. After major reductions in numbers of native plants, all the animal and microbe species associated with the displaced or lost native plant species are also lost or severely reduced in number.

In the United States, an estimated 50,000 species of plants, animals, and microbes have been introduced and are causing an estimated $137 billion in damage and control costs per year. There the invasive species are causing the extinction of about 40% of the native plants, animals, and microbes. This extinction impact is second only to human population impacts.

Hartemink conveys a detailed evaluation of the diverse effects of the invasion of bamboo piper and makes clear how such invasions alter both agriculture and the natural environment. In particular, the island ecosystem provides a unique area in which to investigate the diverse impacts of invasives.

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