***Ardisia elliptica* Thunb.** shoebutton ardisia
MYRSINACEAE

Synonyms: *Ardisia ketoensis* Hayata
Bladhia elliptica (Thunb.) Nakai

General Description.—Shoebutton ardisia, also known as sea-shore ardisia, blackberry, mameyuelo, mata pelandok, penah periah, ati popa'a, and atiu (Corner 1952, Pacific Island Ecosystems at Risk 2002), is an invasive shrub or small tree to 6 m in height and 15 cm in basal diameter. The plants produce strong stems with gray bark. The stems are usually single, but additional sprouts may arise from the rootstalk, especially if the plant is injured. Shoebutton ardisia grows a strong taproot, much-branched laterals, and fine roots with rhizomorphic tips. Leaves have a rubbery or leathery texture and are pink when young, turning dark green later. They are glabrous and alternate with petioles about 1 cm long and blades 8 to 12 cm by about 3 cm. The inflorescences are axillary, and umbellate, corymbose, or racemose with numerous five-merous, pink flowers. The drupes are globose drupes 6 to 11 mm in diameter, dark purple to dull black when ripe and contain one seed each (author's observation, Corner 1952, Howard 1989, Pacific Island Ecosystems at Risk 2002).

Range.—The taxonomy and range of shoebutton ardisia are uncertain. Native areas for *Ardisia elliptica* have been listed variously as Sri Lanka, India, China, Taiwan, Malaya, South East Asia, Indonesia, and the Philippines (Corner 1952, Tomlinson 1986, Yuen-Po 1999). Some authors unite *A. polycephala* Wall., *A. solanacea* Roxb., and *A. humilis* Vahl under A. elliptica (Center for Aquatic and Invasive Plants 2002, Neal 1965, Pacific Island Ecosystems at Risk 2002). These species are difficult to distinguish. Liogier (1995) erroneously cites *A. solanacea* instead of *A. elliptica* in Puerto Rico. Shoebutton ardisia is also naturalized and escaped in Hawaii (Pacific Island Ecosystems at Risk 2002), Florida (Center for Aquatic and Invasive Plants 2002), and many other areas.

Ecology.—Shoebutton ardisia principally grows and is most aggressive in areas of wet soils. It forms dense stands in low areas and intermittent stream bottoms with clay soils in Puerto Rico. It is found in wet, lowland areas in Hawaii (Pacific Island Ecosystems at Risk 2002), in hammocks, disturbed wetlands, old fields, and tree islands in marshes in Florida (Center for Aquatic and Invasive Plants 2002), and in mangroves elsewhere (Tomlinson 1986). The annual precipitation of these areas in Puerto Rico and probably elsewhere is above 1500 mm/yr. The species is shade tolerant and usually grows under forest canopies. Seedlings appear in well-established forest understories—disturbance is not required for establishment. Although significant insect herbivory does occur in Florida, it does not appear to inhibit the advance of the species into new habitats (Dominguez and others 2002).

Reproduction.—Shoebutton ardisia blooms sporadically throughout the year (Miami-Dade County 2002). The species is insect pollinated and self-fertile (Pascarella 1997). A collection of fruits from Puerto Rico weighed an average of 0.321 $\pm$ 0.005 g/fruit. Seeds separated from them weighed (air-dried) an average of 0.0463 $\pm$ 0.001 g/seed. Both the fruits and seeds are uniform in weight (coefficients of variation 15 and 17, respectively). Sown without any pretreatment in commercial potting mix, 75 percent germinated between 42 and 81 days after sowing. Germination is epigenous. Although seedlings are subject to damping-off mortality right after germination, older seedlings transplant with little mortality or loss of vigor. Birds are the principal seed dispersers, although raccoons and opossums in

Florida also eat the fruits and disperse seeds (Miami-Dade County 2002).

Growth and Management.—Although shoebutton ardisia may grow as much as 1 m the first year as a sprout, seedlings and established shrubs grow slowly, usually 0.25 to 0.5 m/year in height. No figures are known for longevity, but 10 to 25 years or more are likely. It is often desirable to control shoebutton ardisia in natural areas. Small numbers of seedlings and shrubs can be eliminated by pulling and grubbing. A broadcast spray of glyphosate is effective in killing dense stands of seedlings but will also kill native plants. Larger plants can be killed by applying a basal spray of triclopyhr mixed with an oil diluent (Pacific Island Ecosystems at Risk 2002).

Benefits and Detriments.—Shoebutton ardisia was once used heavily as an ornamental for accent and background plantings. Many plantings still remain, but the species is no longer cultivated commercially (Miami-Dade County 2002). The fruits are edible and taste slightly sour with a hint of starch but otherwise lack flavor. The species is useful for fuel and vegetable stakes. The air-dry specific gravity of stem wood in Puerto Rico was measured at 0.48 ± 0.01 g/cm^3. Biomass (dry weight) of plants from 137 cm in height to plants with a 5-cm D.B.H. may be calculated by the model: Total Dry Weight in grams = 22.020(stem length in meters) (diameter at 30 cm)^2 (Francis 2000). Shoebutton ardisia is extremely invasive. It forms dense stands under trees in wet sites in Florida, Hawaii, and Puerto Rico that suppress native understory plants (Center for Aquatic and Invasive Plants 2001).

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