Rubiaceae—Madder family

Mitchella repens L.

partridgeberry

K. A. Brinkman, G. G. Erdmann, and Jill R. Barbour

Drs. Brinkman and Erdmann retired from the USDA Forest Service's North Central Forest Experiment Station; and Ms. Barbour is a germination specialist at the USDA Forest Service's National Tree Seed Laboratory, Dry Branch, Georgia.

Growth habit, occurrence, and use. Partridgeberry—*Mitchella repens* L., also called two-eyed berry or running-fox—is an evergreen vine or herb with fruit valuable as food for birds, raccoons, and red foxes (Van Dersal 1938). The natural range is from Texas to Florida, north to southwest Newfoundland, and west to Ontario and Minnesota (Fernald 1950). This attractive plant was introduced into cultivation in 1761 and is often used in rock gardens (Rehder 1940).

Flowering and fruiting. The distylous flowers appear from June to August and can be separated into 2 genetic compatibility groups (Rehder 1940). Plants with short-styled flowers ("thrums") have exserted stamens 15 mm above the ovary and stigmas 10 mm above the ovary; whereas plants with long-styled flowers ("pins") have stamens 11 mm above the ovary and exserted stigmas 16 mm above the ovary (Ganders 1975). The only pollinations that are compatible are those between anthers and stigmas of the same height, that is, between pin and thrum and thrum and pin. The genetic control is by a single gene (S), with thrums the heterozygotes (Ss) and pins the recessive homozygotes (ss) (Allard 1960). Thrums contribute more than three-quarters of all genes transmitted through ovules, and pins more than three-quarters of all genes transmitted through pollen (Hicks and others 1985). Pins and thrums contribute almost equally to gene flow via pollen and ovules.

The flowers occur in pairs on a short peduncle with the base of the calyces fused. Each flower has 1 style and 4 stamens (Fernald 1950). Fruit-set occurs when both flowers of a pair have been pollinated. Bumblebees (*Bombus spp.*) are the principal pollinators of partridgeberry. They fly around a patch of partridgeberry for a mean of 2.3 " 2.3 minutes, visiting 34 " 43 inflorescences per minute (Hicks and others 1985).

Fruits are scarlet drupaceous berries 7 to 10 mm wide that ripen in July but usually persist overwinter (Petrides 1958). The maximum number of seeds that a single full berry may contain is 8 (Hicks and others 1985). The level of natural fruit-set is near 100% for both pins and thrums. In a flowering study in North Carolina, the overall fruit-set level for pins and thrums was 100%, whereas in New York, the fruit-set was 96.1% for pins and 86.5% for thrums (Hicks and others 1985). A Massachusetts study revealed fruit-set values of 96.8% for pins and 96.3% for thrums (Keegan and others 1979).

Collection of fruits; extraction and storage of seeds. Partridgeberry fruits may be picked in late fall. Fruits should be macerated in water and screened to remove the seeds (figures 1 and 2). About 45 kg (100 lb) of fruit yield about 5.4 kg (12 lb) of cleaned seeds (Swingle 1939). Two samples averaged 427,770 seeds/kg (194,000/lb); 98% of the seeds were sound after cleaning (Brinkman and Erdmann 1974; Swingle 1939). Seeds are orthodox in storage behavior

and can be stored for some time in sealed containers at low temperature.

Germination tests. Partridgeberry seeds have internal dormancy, but this can be overcome by 150 to 180 days of stratification at 5 EC (Barton and Crocker 1945). No data are available on results of germination tests.

Nursery practice. Seeds of many other species exhibiting embryo dormancy germinate satisfactorily when sown in the fall, so partridgeberry probably can be handled in the same way. Mulching overwinter should reduce drastic temperature changes and maintain adequate moisture.

References

Allard RW. 1960. Principles of plant breeding. New York: John Wiley & Sons. 485 p.

Barton LV, Crocker W. 1945. Twenty years of seed research. London: Faber & Faber. 148 p.

Brinkman KA, Erdmann GG. 1974. *Mitchella repens* L., partridgeberry. In: Schopmeyer CS, tech. coord. Seeds of woody plants in the United States. Agric. Handbk. 450. Washington, DC: USDA Forest Service: 543.

Fernald ML. 1950. Gray's manual of botany. 8th ed. New York: American Book Co. 1632 p.

Ganders FR. 1975. Fecundity in distylous and self-incompatible homostylous plants of *Mitchella repens* (Rubiaceae). Evolution 29(1): 186–188.

Hicks DJ, Wyatt R, Meacher TR. 1985. Reproductive biology of distylous partridgeberry, *Mitchella repens.* American Journal of Botany 72(10): 1503–1514.

Keegan CR, Voss RH, Bawa KS. 1979. Heterostyly in *Mitchella repens* (Rubiaceae). Rhodora 81: 567–573.

Petrides GA. 1958. A field guide to trees and shrubs. Boston: Houghton Mifflin. 431 p.

Rehder A. 1940. Manual of cultivated trees and shrubs. 2nd ed. New York: Macmillan. 996 p.

Swingle CF, comp. 1939. Seed propagation of trees, shrubs, and forbs for conservation planting. SCS-TP-27. Washington, DC: USDA Soil Conservation Service. 198 p

Van Dersal WR. 1938. Native woody plants of the United States: their erosion-control and wildlife values. Misc. Publ. 303. Washington, DC: U.S. Department of Agriculture. 362 p.

Figure 1—*Mitchella repens,* partridgeberry: seed, H 7.

Figure 2—*Mitchella repens,* partridgeberry: longitudinal section through a seed, H 20.