

Mile-a-minute, *Polygonum perfoliatum* L. (Polygonaceae), a New Potential Orchard and Nursery Weed¹

Robert J. Hill,² G. Springer, L. B. Forer

The genus *Polygonum* is a nearly cosmopolitan assemblage of herbs, shrubs, or (rarely) vines. Several important agricultural weeds are found within the genus, including Pennsylvania smartweed (*P. pensylvanicum* L.) and dock-leaved smartweed (*P. lapathifolium* L.); both are native North American plants. The recently introduced shrub, Japanese knotweed (Fleece-wood, Mexican bamboo, *P. cuspidatum* Sieb. & Zucc.), is becoming a menace because of its rapid spread along drainage systems in the eastern United States. This circular gives information on yet another knotweed, *P. perfoliatum* L., that has escaped the notice of most plant scientists despite rapid invasion of orchards and nurseries.

Fig. 1. Dense, matted growth of Polygonum perfoliatum completely covering a pile of wood at a York County, PA nursery.

P. perfoliatum (Fig. 1) is native to Japan, Korea, China, the Malay Peninsula, and India (Ohwi 1965). It grows best in moist, well-drained soil with maximum light exposure; however, it survives shade situations. The time and means of arrival of this plant to the United States are in dispute; the data suggest multiple entry. The first American record of the plant can be found in the Gray Herbarium of Harvard University. This specimen is dated

1 Initial work was carried out while the senior author was employed by the Bureau of Plant Industry, Pennsylvania Department of Agriculture under a cooperative USDA-PDA program to survey noxious weeds in Pennsylvania.

2 Present address: Department of Biology, York College of Pennsylvania, York, PA 17405.

1890's from ballast near Portland, Oregon (Hickman and Hickman 1976-77). Shelter and Skog (1978) cite the taxon as an element of the Canadian flora. Investigation has revealed that it is known from a single collection (1954) from Pitt Meadows, British Columbia. Major herbaria in both Canada and the Pacific Northwest have no additional specimens. The absence of subsequent collections at both sites suggests that these populations either have not survived, or are being mistaken for one of the more common weeds which resemble *P. perfoliatum* and thus are not being collected.

All other early records of the plant are from York County, Pennsylvania, with the earliest specimen collected in 1946 from an old orchard near Stewartstown. There the plants were first noticed in rhododendron nurseries. It is probable that imported nursery stock from eastern Asia acted as the source of introduction and, in fact, a rhododendron breeder from Stewartstown is known to have imported stock from Asia. There is a documented case of the dispersal of *P. perfoliatum* from Stewartstown rhododendron to the Swarthmore College campus where five populations have been established since 1972 (Hickman and Hickman 1976-77).

Distribution: Recent field investigations in York and Lancaster counties have resulted in positive identification of this taxon as a widespread roadside and nursery weed occupying a niche similar to that of the noxious Japanese honeysuckle. Present distribution of mile-a-minute (a local name alluding to its rapid growth) includes Adams, York, Lancaster, Dauphin, and Delaware counties, Pennsylvania. Riefner and Windler (1979) list the plant from Anne Arundel, Baltimore, Carroll, Cecil, Harford, and Howard counties, Maryland.

Life History: Little information is available on the life history of this annual, Asiatic vine in North America. Seedlings are established by late April in our temperate climate, and growth is rapid during May through August. The fruits ripen late in the season, starting mid-September into November. Hickman and Hickman (1976-77) report some populations flowering in mid-October, which is inordinately late in the season. In the fall, during the time of fruit ripening, winter birds are found in large numbers in woodland thickets and along wet, low ground. It is here that *P. perfoliatum* grows and probably supplies fleshy fruits for the birds' diet; the birds in turn will disperse the

seeds to uncolonized areas. The highly attractive, fleshy, pendulous fruits are suitable for bird dispersal. As are many weed species, *P. perfoliatum* is an aggressive plant adapted to life in a new environment where few natural enemies occur.

Diagnostic Characteristics: The prickly annual vine (Fig. 2) is easily distinguished by triangular (deltoid) leaves, retrorse barbs on the vine, a leaf-like bract which completely encircles the stem, and fleshy-iridescent blue "berries."

Technical Evaluation: The stems of *P. perfoliatum* L. are elongated, branched, and green becoming woody, red-brown toward the root base. Retrorse, short spikes, 1-2 mm long, arm the stems, petioles, and primary and secondary veins of the leaves. The leaves themselves are deltoid, 3-6 cm long and as wide at the base. They also appear thinly membranous, glaucous, or pale green. The apex of the foliage is acute to subacute with the base truncate to barely cordate. The perianth measures 3-4 mm long. With maturity, the persistent calyx thickens and swells to yield a spherical, fleshy

Fig. 2. Polygonum perfoliatum vine bearing retrorse barbs, deltoid leaves, perfoliate bracts, and clusters of "berries."

iridescent blue achene resembling a "berry." This fruit can be retained long after the vine itself dies.

P. perfoliatum, with its prickly stems and leaves, is an excellent climber and can travel six m over shrubs and under-story trees. The plant will spread rapidly and reach noxious densities, thus deserving of the common name "minute weed." Where it occurs, it is seldom found as singular plants but is locally abundant in dense populations.

Confused Taxa: *P. perfoliatum* most closely resembles *P. arifolium* L. (halberd-leaved tearthumb), *P. sagittatum* L. (arrow-leaved tearthumb), and *P. convolvulus* (black bindweed). *P. arifolium* and *P. sagittatum* are "tear thumb" vines, with prickles, occurring in wet lowlands or fresh to brackish tidal marshes, usually not reaching the extensive height of *P. perfoliatum*. Minute-weed inhabits moist thickets, wood piles, roadsides, ditches, fallow fields, clearings, and forest perimeters and attains a height of six m or more. Differentiation of *P. perfoliatum* from the other three taxa is readily accomplished by examination of fruits and leaf bases. The fruits of all except mile-a-minute are dry and non-fleshy, never resembling a berry. The leaf bases are straight to slightly curved (peltate, shield shaped) in *P. perfoliatum*, whereas they have lobes pointing outward at wide angles (hastate) in *P. arifolium* and have lobes directed downward (sagitate) in *P. sagittatum*. The leaves are heart shaped (cordate) in *P. convolvulus* with stems devoid of barbs. Owing to the tall, vining habit, and red-colored, woody twigs, *P. perfoliatum* most closely resembles *P. convolvulus*; it is more shade tolerant than *P. arifolium* or *P. sagittatum*.

Economic Importance: Although most natural populations occur along roadsides and in moist thickets, recent appearance of this plant in orchards and nurseries suggests that it is a potential weed of economic importance. Owing to its morphology and habitat preference, the plant is well adapted for dispersal from nursery to nursery or nursery to planting-bed. Viable seeds can be transported in the rootballs of nursery stock. The aerial portion of the vine, dying prior to winter, retains both seeds and barbs on the stems, which allow for transmission of diaspores directly on rhododendron and other plants. Mile-a-minute is a colonizing taxon with the ability to out-compete much of the native flora. In fact, areas have been observed where it has displaced the troublesome Japanese honeysuckle which rapidly destroys the indigenous vegetation.

Control: Roundup (Monsanto Co.) effectively controlled dense stands of mile-a-minute. Because this herbicide has only post-emergence effectiveness, various pre-emergence herbicides need to be evaluated.

References: Hickman, J. C. and C. S. Hickman. 1976-77. *Polygonum perfoliatum*: a recent Asiatic adventive. *Bartonia* 45:18-23; Ohwi, J. 1965. *Flora of Japan*. Smithsonian Institution Press, Washington, D.C. p. 408; Riefner, R. E. and D. R. Windler. 1979. *Polygonum perfoliatum* L. established in Maryland. *Castanea* 44: 91-93; Shetler, S. G. and L. E. Skog. 1978. Checklist of Species for Flora North America. Missouri Botanical Garden, Report 84. p. 14.



