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## Stylophorum diphyllum, Wood Poppy- Rare for a Reason - 4 (3)



by Jane Bowles

In May 1887 poet/naturalist Robert Elliot presented a specimen of a spectacular yellow-flowered poppy to the London chapter of the Entomological Society of Ontario. He had discovered wood poppy (*Stylophorum diphyllum*) growing in a few isolated patches along the Thames River near his home in Plover Mills. A few more discoveries were made close by over the next couple of years and then there were no more reports of this plant for almost a century.

When the *Atlas of Rare Plants of Ontario* (Argus et al., 1982-1987) was published, *Stylophorum diphyllum* was listed as "probably extirpated" in Ontario. However, that same year a population of about 700 plants was found in a woodland just outside London. This appeared to be the only stand in the country, and the wood poppy was listed as endangered in Canada in 1993 by the Committee on the Status of Endangered Wildlife in Canada. Still, it received no real protection. That fall some logging and filling was done at the wood poppy site which destroyed about 500 plants.

In 1994 the Ontario Endangered Species Act came into effect and the wood poppy and its habitat were now protected. Since 1997 a recovery team has been working to understand more about the plant's ecology in order to ensure its survival.

Once the wood poppy and its status became known in the London area two people reported having seen it in the wild in the 1970s. After a number of searches, both patches were rediscovered. Currently, the total known wild population of wood poppy in Canada consists of about 450 plants in three locations. All are within 15 kilometres (about nine miles) of London and two are along the Thames River. At one site there are only six plants occupying one square metre (a little more than a square yard) of ground. No seedlings or new recruits have ever been reported there.

In addition to the wild populations there are about 220 "captive" wood poppies. One collection is growing under ginseng shade at the Environmental Field Station at the University of Western Ontario; the other is at the Royal Botanical Gardens in Hamilton. All were grown from seed collected in the wild in Ontario. About 200 are from 21 sources of known maternal origin (i.e. it is known which individual plants the seeds came from). This is valuable information enabling botanists to keep track of which plants belong to which genetic lines and whether there are differences among the populations.

Wood Poppy is not an easy plant to spot except for the few days in spring when it is flowering. The leaves are very similar to those of greater celandine (*Chelidonium majus*), a close relative. They are basal, long-stalked and deeply lobed, dark green above, paler below and slightly waxy. The flowers are much larger than those of celandine, up to five centimetres (about two inches) across, and the same deep shining yellow as a marsh marigold (*Caltha palustris*). The flowering stem has a pair of leaves about two-thirds of the way up from the base (hence the specific name

*diphyllum* which means two-leaved) and one to four flowers. The stem is hollow and slightly fleshy and all parts of the plant produce an acrid dark orange juice. Flowering occurs in May but the leaves remain green all summer. The fruit are greyish capsules the shape of a football; they are covered with stiff fleshy hairs. As the fertilized seeds grow and get heavier the capsule hangs downwards under its own weight. When the seeds are ripe the capsule splits open and the seeds fall to the ground. They are about 1.5 mm (1/10 inch) in diameter, dark brown and have a contrasting white fringe of oil bodies (tiny balloons filled with oil) arranged like a Mohawk hairdo.

Wood poppy is one of several plants that are rare in Canada because they are at the extreme northern limit of their range. In the United States, especially Kentucky, eastern Missouri, southern Illinois and western Virginia, the species is fairly common, although it grows in widely scattered localities. Often the genetics of outlying plants are distinctly different from those growing near the centre of the range. Outlier populations are important for maintaining genetic diversity in the population as a whole, an issue currently under study. Collections of material have been made to examine the genetic variation within and among the three Canadian and several US populations. For example, it is not known if the Ontario wood poppies are all closely related (implying a single colonization that since dispersed) or if they represent two or more colonization events. If it is found that one population is distinctly different, and related to plants from Kentucky or elsewhere in the United States, then it suggests a post-settlement introduction at that site i.e. a garden escape. Until we know more it is important that the Canadian germ lines (genetic lines) not be "contaminated" with foreign material.

The big question about wood poppy is: why is it so rare in Canada? At first glance it does not have the characteristics that typify rare species. Many plants are rare because they require specialized habitats that have been fragmented or destroyed as a result of European settlement. This is not the case for *Stylophorum diphyllum*. Suitable habitat seems to be readily available, and the plant was extremely rare here even before European settlement. None of the life history traits of wood poppy suggest why the species might be rare. The plants mature quickly and can flower in their first year. The adults are long-lived and produce blossoms most years. Flowering is quite profuse and the flowers are self-compatible (meaning that the pollen of a flower is capable of fertilizing an ovule in the pistil of the same flower). This is a useful strategy for plants that grow in woods early in the season when there may be few pollinators, so that cross-pollination is not always an option.

The average wood poppy produces about 2,000 seeds a year. Once the seeds have undergone a period of cold stratification to break dormancy, germination rates are reasonably high. Under cultivation wood poppy can even have distinctly weedy tendencies.

The factors limiting the increase and spread of wood poppy populations appear to be connected with seed survival and germination. The seeds are normally dispersed by ants, a phenomenon known as myrmecochory that is common among woodland herbs. The ants are attracted by the oil body (elaiosome) and carry the seed off to their nest. Once there, the nutritious oil body is removed and the hard-coated kernel is discarded. An ant midden provides an ideal place for the remaining seed to germinate. However, recent studies have found that there is competition between ants and mice for wood poppy seeds and, if the mouse gets there first, the whole seed is eaten and never has a chance to produce a new plant.

There may be other factors, unknown to us, that limit germination in the wild. Seeds collected and planted at existing wood poppy sites failed to germinate, even though seeds planted in cultivation have done well. The germinating seed may require nothing more than a site safe from competition and predation, but further study is required. The recovery team is currently attempting to uncover and overcome the roadblocks to successful wood poppy reproduction.

Native plant gardeners have shown themselves eager to aid in the wood poppy's recovery by introducing the plants into their own gardens. However, the recovery team urges caution. The "wild turkey approach" is entirely inappropriate. Introducing *Stylophorum diphyllum* from a variety of

unknown sources into places it has never grown naturally may not help the recovery effort; in fact, it could disrupt local ecosystems. Furthermore, there may be important ecological and genetic messages in the rarity of the wood poppy. In our enthusiasm to save the species we should not erase those messages before they have been read and understood.

*Jane Bowles is a freelance ecologist and adjunct professor in the Departments of Biology and Geography at the University of Western Ontario in London. She is concerned with protecting natural habitats and native species in the fragmented landscape of southern Ontario. With Michael Oldham she wrote the original Status Report for Wood Poppy in 1991 and has since served on the recovery team for this plant.*

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