



My view

Arnold P. Appleby

Professor Emeritus, Crop Science,
Oregon State University, Corvallis, OR 97331

I have noticed in recent years that terminology for belowground structures of weeds in extension brochures, classroom lectures, short courses, grower meetings, etc., all by weed scientists, has sometimes been used somewhat carelessly and imprecisely. Whether a weed spreads laterally by rhizomes or roots may not be of major concern to a grower or applicator, but weed scientists should try to be as accurate as possible.

To review, a rhizome is an underground stem, also called a rootstock. It differs visually from a root in having nodes and internodes, which the root does not have. Stolens are creeping horizontal stems aboveground. Sometimes a creeping perennial broadleaf is described as spreading by an extensive rhizome system, perhaps because a previous bulletin described the plant that way, and the author has not investigated to see whether the description is accurate. I have seen Canada thistle described this way. But years ago, we sectioned the horizontal organs of Canada thistle and examined cross sections under a microscope. They were all roots.

Recently, I have spent a few hours reviewing the literature, sometimes going back to reports more than 50 yr old. There was a lot of very good botanical work done then. I have come to the following conclusions:

(1) The majority of the important creeping perennial broadleaves, at least in the western U.S., spread laterally by roots, not rhizomes. This is true of Canada thistle, field bindweed, hoary cress, Russian knapweed, red sorrel, yellow toadflax, leafy spurge, and perennial sowthistle. Stem tissue can arise from root buds, sending a shoot toward the surface to form a new aboveground shoot. This vertical or oblique belowground section of the shoot generally is called a rhizome by botanists (although one author restricts the definition of rhizome to a belowground *horizontal* stem).

To be sure, broadleaves can spread by rhizomes as well. Korsmo (1954) lists numerous species as having lateral rhizomes. Most of these are Norwegian weeds unknown to me. Familiar weeds with rhizomes are field chickweed, hedge bindweed, and common yarrow.

(2) Creeping perennial sporophytes and monocots seem to spread laterally by rhizomes. These include field horsetail and brackenfern (sporophytes), and quackgrass, johnsongrass, cattail, soft rush, and nutsedge (monocots). I found no exceptions. These rhizomes

can produce roots and shoots at the nodes. The shoots then can grow to the surface and produce new aboveground shoots. Some of these rhizomes can be extremely persistent. One report estimates that rhizomes of brackenfern can survive at least 50 yr! Some of the rhizomes may have tubers, also stem tissue, along the rhizome or at the terminal end.

This was not an exhaustive literature search, and there may be many exceptions. I believe the above conclusions are generally accurate for North America.

Most weeds have been studied anatomically, and reports are in the literature. If not, this offers an opportunity to do some simple studies ourselves. We should do our best to use proper terminology whenever possible.

Selected References

- Best, K. F., G. G. Bowes, A. G. Thomas, and M. G. Maw. 1980. The biology of Canadian weeds. 39. *Euphorbia esula* L. Can. J. Plant Sci. 60:651–663.
- Cody, W. J. and C. W. Crompton. 1975. The biology of Canadian weeds. 15. *Pteridium aquilinum* (L.) Kuhn. Can. J. Plant Sci. 55:1059–1072.
- Frazier, J. C. 1943a. Nature and rate of development of root system of *Convolvulus arvensis*. Bot. Gaz. 104:417–425.
- Frazier, J. C. 1943b. Nature and rate of development of root system of *Lepidium draba*. Bot. Gaz. 105:244–250.
- Frazier, J. C. 1944. Nature and rate of development of root system of *Centaurea picris*. Bot. Gaz. 105:345–351.
- Grace, J. B. and J. S. Harrison. 1986. The biology of Canadian weeds. 73. *Typha latifolia* L., *Typha angustifolia* L., and *Typha glauca* Godt. Can. J. Plant Sci. 66:363–379.
- Harris, W. 1970. Genecological aspects of flowering and vegetative reproduction in *Rumex acetosella*. N. Z. J. Bot. 8:99–113.
- Hayden, A. 1934. Distribution and reproduction of Canada thistle in Iowa. Am. J. Bot. 21:355–373.
- Korsmo, E. 1954. The Anatomy of Weeds. Kirstes Boktrykkeri, Oslo. 413 p. [Contains references on quackgrass, soft rush, chickweed, and sowthistle.]
- McWhorter, C. G. 1989. History, biology, and control of johnsongrass. Rev. Weed Sci. 4:85–121.
- Saner, A., D. R. Clements, M. R. Hall, D. J. Doohan, and C. W. Crompton. 1995. The biology of Canadian weeds. 105. *Linaria vulgaris* Mill. Can. J. Plant Sci. 75:525–537.
- Stoller, E. W., D. P. Nema, and V. M. Bhan. 1972. Yellow nutsedge tuber germination and seedling development. Weed Sci. 20:93–97.
- Watt, A. S. 1940. Contributions to the ecology of bracken. I. The rhizome. New Phytol. 39:401–422.
- Wells, W. A. and J. L. Riopal. 1972. In vitro studies of adventitious rooting in *Convolvulus sepium*. Bot. Gaz. 133:325–330.