

# Plant Diversity Website

## ***Cymbalaria muralis*** G. Gaertn., B. Mey., & Scherb.

**Common Names:** Kenilworth ivy, coliseum-ivy, pennywort, Oxford-ivy, ivy-leaved toadflex, mother-of-thousands, wandering-sailor, Italian bastard navel-wort, *flor de muralla* (Spanish), *ruine de Rome* (French), *Mauer-Zimbelkraut* (German) (1,2,6,8,11,19,23).

**Etymology:** The genus name *Cymbalaria* comes from the Latin word *cymbalum*, which means “a cymbal” referring to the similarity of the round leaves to the shape of a musical cymbal. The word *muralis* means “of walls” (4).

**Botanical synonyms:** *Antirrhinum cymbalaria* L., *Elatine cymbalaria* (L.) Moench, and *Linaria cymbalaria* (L.) Mill. (2).

**FAMILY:** Plantaginaceae (the plantain family)

### **Quick Notable Features:**

- Reddish stems growing on walls and rocks, rooting at the nodes
- Simple, alternate leaves with 3-9 round to triangular lobes ending in a sharp point
- Zygomorphic, light purple to blue flowers
- Fruiting pedicels growing away from sunlight

**Plant Height:** The low growing *C. muralis* is 7.6-15.2cm tall and up to 60cm long (16,20).

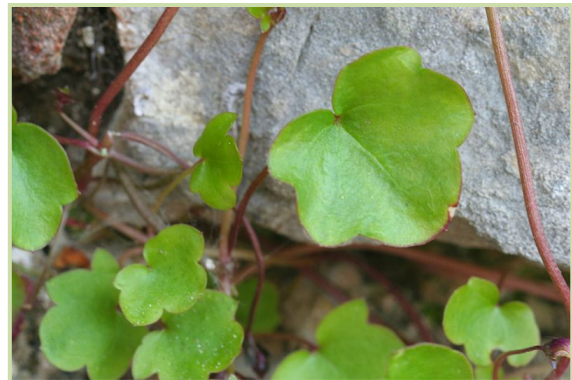
### **Subspecies/varieties recognized (2):**

- C. muralis* subsp. *muralis*
- C. muralis* subsp. *pubescens* D.A. Webb
- C. muralis* subsp. *visianii* D.A. Webb

**Most Likely Confused with:** *Halerpestes cymbalaria*, *Kickxia elatine*, *Veronica hederifolia*, *Glechoma hederacea*, *Hedera helix*.

**Habitat Preference:** Usually found on disturbed and waste places, but also rocky shores of seas and lakes, near buildings, and along sidewalks. The coliseum-ivy is capable of growing on walls and enduring the harsh conditions of this habitat, especially aridity and high alkalinity, whereas it thrives on moist walls. *C. muralis* is shade tolerant and grows luxuriantly in well-drained soils (1,2,4,7,9,20,24).

**Geographic Distribution in Michigan:** *C. muralis* has naturalized and been collected from Washtenaw, Wayne, St. Clair, Benzie, Antrim, Emmet, and Houghton counties (1).



**Known Elevational Distribution:** The coliseum-ivy grows at an altitude of 1140m above sea level in Austria (6).



**Complete Geographic Distribution:** Native to Mediterranean Europe and naturalized to central Europe in the 16<sup>th</sup> century, introduced by Romans (12). In North America, *C. muralis* is found in the United States (AR, CA, CO, CT, DE, HI, IL, IN, KY, MA, MD, MI, MO, NC, NE, NJ, NY, OH, OR, PA, SC, SD, TN, UT, VA, VT, WA, WI, WV), Canada (BC, MB, NB, NS, ON, QC) (5), and Mexico. The species was also introduced in Australia, Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, Guatemala, Honduras, Japan, New Zealand, Peru, Saint Helena, and South Africa. In Europe, it is found in Austria, Belgium, Denmark, France, Germany, Greece, Italy, Luxembourg, Netherlands, Norway, Poland, Portugal, Spain, Sweden, Switzerland, and United Kingdom (2,6).

**Vegetative Plant Description:** As an annual or perennial, the herbaceous *C. muralis* has glabrous, narrow, red-brown trailing stems up to 60cm long that root at the nodes. The long petioled leaves are alternate (opposite near the base of the plant), simple, glabrous, reniform to orbicular, and basally cordate. They are 1-3cm broad, palmately veined and lobed. The 3-9 shallow lobes are round or triangular, ending in a sharp point. The species is evergreen or semi-evergreen where winters are harsh (1,4,15,16,17,20).

**Climbing Mechanism:** The species probably uses its roots to climb, although no reference was found in the literature and no direct observations have been made.

**Flower Description:** The flowers are axillary, solitary, perfect, and zygomorphic. The slender pedicels are ca. 2.1cm long. The 5-parted calyx is 2-2.5mm long and glabrous, the lobes subequal. The light purple or light blue, less commonly pinkish to red corolla (7-9mm long) has 2 upper and 3 lower lobes, with a yellow palate and an abaxial short spur; the flowers produce nectar. The 4 stamens are epipetalous and didynamous, not exerted from the throat of the corolla. The superior ovary is bicarpellate, with a single slender style and 0 or 2 stigmas (1,2,4,12,13,15,17,18).

**Flowering Time:** In the central and northeastern United States and Canada, the species flowers from May to October (4).

**Pollinator:** *C. muralis* is autogamous as well as bee pollinated (7). The flowers have yellow "honey guides" to direct honey bees to the center, where pollen and nectar are present (14).

**Fruit Type and Description:** The 0.4cm broad capsules are globose, glabrous, and bear less than 50 seeds. Mature capsule pedicels are about 4.2cm long. The 2 locules are of different sizes and do not open at the same time: the lower and larger locule opens first. One or two seeds remain attached to the capsule (4,12,15,18,21).

**Seed Description:** The seed surface is highly irregular, a characteristic that is visible even through the capsule wall. The ellipsoid seeds also differ in size; those in the upper locule are



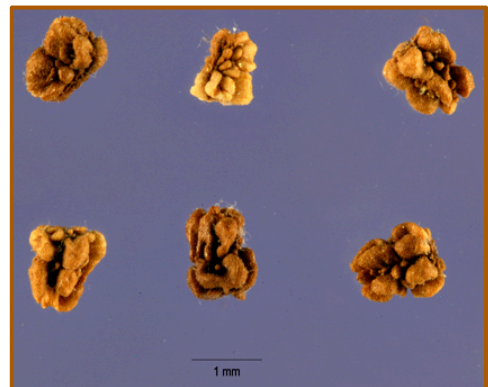
smaller. The irregular surface allows seeds to stick together, forming clumps. The seeds are ca. 1mm long and about 0.6-1mm wide (4,12, see seed image).

**Dispersal Syndrome:** At maturity, the capsules dry to release the seeds. “*C. muralis* seeds are thought to be dispersed to suitable microsites mostly by recurving their fruiting pedicels in a negative phototropic reaction.” Observations showed that an average of 16.9% of the capsules produced by a plant achieve the goal of depositing seeds on a suitable site. Additionally, the

seed(s) that remain attached to the capsule may be transported by wind or birds. Seeds remain viable in water, which suggests yet another possible dispersal agent (4,12).

**Distinguished by:** *Halerpestes cymbalaria* is an herb whose leaves are similar in size and shape to *C. muralis*, but the inflorescence is basal and bears up to 10 actinomorphic yellow flowers on a single peduncle, each with many stamens and pistils, and the fruit is an achene. *Kickxia elatine* is pubescent, the leaves are hastate to sagittate and pinnately veined, and the flowers have a yellow lower lip and violet upper lip. In contrast, *C. muralis* is glabrous, the leaves are round, 3-9 lobed, and palmately veined, with a light purple to blue corolla only yellow on the palate. *Veronica hederifolia* principal leaves are wider than long, but similarly lobed (3-5 lobes). The flowers are nearly actinomorphic, very distinctive from the clearly zygomorphic *C. muralis* flowers, and the calyx is ciliate, not glabrous. *Glechoma hederacea* is a glabrous to pubescent creeper with opposite leaves throughout, not only basally. The flowers bear exposed stamens and style, and are larger (1.6-2.2cm long) than the flowers of *C. muralis*. *Hedera helix* is a high climbing (by aerial roots) perennial woody vine with similarly lobed leaves, but each lobe is acute and does not end in a sharp point like *C. muralis*. The inflorescence is an umbel bearing 8-20 yellowish-green flowers that produce black berries (1,4,22).

**Other members of the family in Michigan (number species):** *Antirrhinum* (1), *Besseyia* (1), *Callitriche* (4), *Chaenorhinum* (1), *Chelone* (2), *Collinsia* (2), *Digitalis* (4), *Gratiola* (3), *Hippuris* (1), *Kickxia* (1), *Leucospora* (1), *Linaria* (3), *Littorella* (1), *Misopates* (1), *Nuttallanthus* (1), *Penstemon* (6), *Plantago* (9), *Veronica* (16), *Veronicastrum* (1) (source 1).



**Ethnobotanical Uses:** The leaves of the coliseum-ivy are edible and can be added to salads, although caution is advised as some parts of the plant may be toxic if ingested in excess. The plant is used to treat scurvy and as a poultice to heal wounds. The flowers can be made into a non-permanent yellow dye (7). An infusion of the flowers is used as a diuretic in the Canary Islands (11).

**Phylogenetic Information:** The genus *Cymbalaria* is a member of the Plantaginaceae, which is within the order Lamiales (Asterid I clade of the Core Eudicots). Plantaginaceae formerly was a part of the Scrophulariaceae (3).

**Interesting Quotation or Other Interesting Factoid not inserted above:** *Cymbalaria muralis* was identified as one of the plants growing on historic buildings and monuments in Europe, contributing to their deterioration. An example of such buildings where *C. muralis* was identified growing is the Seville Cathedral in Spain. Different plants have different ways of affecting historical buildings: increased dampness of walls, creating microclimates ideal for biodeteriogens and other harmful organisms, growth of roots damaging the structure, and aesthetic changes are a few. *C. muralis* root acidity is one of the factors that increase the weathering rate of historic buildings (8). *C. muralis* is also one of the most abundant species growing on walls of Italian urban centers (9). A study in England showed that the flowering time of 385 species during the decade of 1991-2000 was on average 4.5 days earlier than in 1954-1990 due to climate change. One of the species that showed an extreme response was *C. muralis*, flowering up to 35 days earlier than previously. It used to flower first on April 15<sup>th</sup>, and by the end of the studied decade, the first flower was on March 11<sup>th</sup> (10). Seedlings of *C. muralis* are able to germinate and survive after immersion in water for up to 39 days (12).

#### Literature and websites used:

1. *Michigan Flora Online*. A.A. Reznicek, E.G. Voss, & B.S. Walters. February 2011. University of Michigan. Web. March 7, 2013. <http://www.michiganflora.net/species.aspx?id=1939>.
2. Tropicos.org. Missouri Botanical Garden. 07 Mar 2013 <<http://www.tropicos.org/Name/29204499>>
3. Stevens, P.F. Angiosperm Phylogeny Website. Version 12, July 2012. <http://www.mobot.org/mobot/research/apweb>.
4. Fernald, M.L. 1950. *Gray's Manual of Botany*, 8<sup>th</sup> ed. New York: American Book Company.
5. USDA, NRCS. 2013. The PLANTS Database (<http://plants.usda.gov>, 03/07/2013). National Plant Data Team, Greensboro, NC 27401-4901 USA.
6. Gbif.org. Global Biodiversity Information Facility. [http://data.gbif.org/occurrences/searchCountries.htm?c\[0\].s=20&c\[0\].p=0&c\[0\].o=6070565](http://data.gbif.org/occurrences/searchCountries.htm?c[0].s=20&c[0].p=0&c[0].o=6070565)
7. Plants For A Future, 1996-2012. Accessed: 07 March 2013. <http://www.pfaf.org/user/Plant.aspx?LatinName=Cymbalaria+muralis>
8. Mishra, A.K., K.K. Jain, & K.L. Garg 1995. Role of higher plants in the deterioration of historic buildings. *The Science of the Total Environment* 167: 375-392.
9. Benvenuti, S. 2004. Weed dynamics in the Mediterranean urban ecosystem: ecology, biodiversity and management. *Weed Research* 44(5): 341-354.
10. Fitter, A.H. & R.S.R. Fitter 2002. Rapid changes in flowering time in British plants. *Science* 296(5573): 1689-1691.
11. Darias, V., D. Martín-Herrera, S. Abdala, & D. de la Fuente 2001. Plants used in urinary pathologies in the Canary Islands. *Pharmaceutical Biology* 39(3): 170-180.
12. Jughans, T. & E. Fischer 2008. Aspects of dispersal in *Cymbalaria muralis* (Scrophulariaceae). *Botanische Jahrbücher* 127(3): 289-298.
13. Freeman, C.E., W.H. Reid, & R.D. Worthington 1985. Patterns of floral nectar-sugar composition of *Ipomopsis longiflora* (Polemoniaceae) near the contact zone of its subspecies *Longiflora* and *Australis*. *American Journal of Botany* 72(11): 1662-1667.
14. Abrol, D.P. 2012. *Pollination Biology, Chapter 13: Biochemical basis of plant-pollination interaction*. Netherlands: Springer.
15. Jepson Flora Project (eds.) 2012. *Jepson eFlora*, [http://ucjeps.berkeley.edu/cgi-bin/get\\_IJM.pl?tid=21640](http://ucjeps.berkeley.edu/cgi-bin/get_IJM.pl?tid=21640) [accessed on March, 08, 2013]

16. Missouri Botanical Garden. Plant details: *Cymbalaria muralis*. [accessed on March, 08, 2013] <http://www.missouribotanicalgarden.org/gardens-gardening/your-garden/plant-finder/plant-details/kc/e873/cymbalaria-muralis.aspx>
17. UMassAmherst Landscape, Nursery, & Urban Forestry Program 2013. *Cymbalaria muralis*. <http://extension.umass.edu/landscape/weeds/cymbalaria-muralis> [accessed on March, 08, 2013]
18. Britton, N.L. & H.A. Brown 1970. *An Illustrated Flora of the Northern United States and Canada: Volume III*. New York, NY: Dover Publications, Inc.
19. USDA, ARS, National Genetic Resources Program. *Germplasm Resources Information Network - (GRIN)* [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. <http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?400188> (02 April 2013)
20. Szczeńśniak, E. & K. Świerkosz 2003. *Cymbalaria muralis* and *Cymbalarietum muralis* in Lower Silesia. *Phytogeographical problems of synanthropic plants*: 185-193.
21. Juan, R., J. Pastor, & I. Fernandez 2000. SEM and light microscope observations on fruit and seeds in Scrophulariaceae from southwest Spain and their systematic significance. *Annals of Botany* 86: 323-338.
22. Waggy, M.A. 2010. *Hedera helix*. In: Fire Effects Information System, [Online]. U.S.D.A., Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: <http://www.fs.fed.us/database/feis/> [2013, April 2].
23. Don, G. 1838. *A general system of gardening and botany: containing a complete enumeration and description of all plants hitherto known with their generic and specific characters, places of growth, time of flowering, mode of culture and their uses in medicine and domestic economy, Vol. 4*. London: Gilbert & Rivington Printers.
24. AWN Consulting Limited 2006. Environmentalw Report: Flora & Fauna. Cycling in Dublin. [http://cyclingindublin.com/wp-content/uploads/2012/09/06\\_FINAL\\_ENVIRONMENTAL\\_REPORT\\_flora\\_fauna.pdf](http://cyclingindublin.com/wp-content/uploads/2012/09/06_FINAL_ENVIRONMENTAL_REPORT_flora_fauna.pdf)

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