Rumex crispus L. (Polygonaceae)
Curly Dock

Description. Monoecious perennials, from stout, erect rootstocks. Stems 3 to 10 dm tall, erect, simple, glabrous. Leaves alternate, the stipules modified into prominent sheaths, blades lanceolate to elliptic, 8 to 40 cm long, 1 to 6 cm wide, bases rounded to subcordate, apices acute to acuminate, margins undulate, the lower leaves petiolate, the cauline leaves gradually reduced upwards, short-petiolate. Inflorescence 10 to 30 cm long, an open panicle, the branches ascending, glabrous, bracteate. Flowers unisexual, pedicellate, spreading to pendulous, perianth parts in two whorls of 3 each, 1.5 to 2 mm long, greenish, fused near the base, the inner ones 3 to 5 mm long in fruit, usually entire, each with a dorsal tubercle ca. 1.5 to 2.5 mm long and less than 1/3 the width of the tepal, the tubercles reticulated; staminate flowers with 6 stamens; pistillate flowers with one superior ovary, the styles 3, the ovary 3-angled, with 1 locule. Fruit a 3-angled achene, 2 to 3 mm long, brown. In California, flowering from March to July (September). (Gleason and Cronquist 1991, Hickman 1993,, Kaul 1986, Munz 1959, Welsh 1984).

Related, weedy species include *R. conglomeratus* (green dock) and *R. pulcher* (fiddle dock). The inner tepals of green dock are entire and not wing-like, while those of fiddle dock are wing-like and distinctly toothed. The inner tepals of green dock each have a single wart-like tubercle, but in fiddle dock only 1 of the inner tepals has a wart-like tubercle, the other two only weakly developed (Gleason and Cronquist 1991, Hickman 1993, Kaul 1986).

Geographic distribution. A native of Eurasia, curly dock has become naturalized throughout North and South America, Australia, New Zealand, southern Africa and Hawaii (Chapman 1991, Clapham et al. 1982, Fernald 1950, Gleason and Cronquist 1991, Holm et al. 1977, Kaul 1986, Munz 1959, Wagner et al. 1990, Webb et al. 1988).

Rumex conglomeratus has become naturalized along the Pacific coast of North America, and in northeastern North America, southern Africa, and Hawaii (Arnold and de Wet 1993, Fernald 1950, Gleason and Cronquist 1991, Mosyakin and Wagner 1998, Munz 1959). *Rumex pulcher* apparently has become naturalized along the Atlantic and Pacific coasts of North America and Hawaii (Gleason and Cronquist 1991, Munz 1959, Wagner et al. 1990).

Rumex crispus was first reported from California (Oakland, Monterey) by Watson (1880). However, it probably was widely distributed prior to the late 1800s, because its seeds were found associated with early Spanish settlements dating back to the late 1700s (Hendry and Bellue 1925, Robbins 1940). Both *R. conglomeratus* and *R. pulcher* were probably widely established in California prior to the end of the 19th century (Robbins 1940).

Rumex crispus is known from all the California Channel islands except Santa Barbara, *R. conglomeratus* is reported only from Santa Rosa and Santa Catalina islands, and *R. pulcher* only from Santa Cruz Island (Junak et al 1997). All 3 species are widely distributed in most California counties west of the Sierra Nevada, but *R. crispus* extends eastward to the deserts (Anonymous 1998).

Reproductive and vegetative biology. *R. crispus*, *R. conglomeratus*, and *R. pulcher* are monoecious. *Rumex crispus* is self-compatible and wind-pollinated (Allard 1965, Proctor et al.

1996). Seeds of *R. crispus* remain viable for at least 7 years under field conditions, and do not show any special dormancy (Cavers and Harper 1964, 1967, Walmsley and Davy 1997a). Under certain conditions their viability remains high for 50-80 years (Darlington 1931, Toole and Brown 1946). Williams (1971) reported considerable variation in seed size and germination patterns as a result of interspecific hybridization with *Rumex obtusifolius* in Britain. Seeds of *R. crispus* require light for germination (Steinbauer and Grigsby 1960) , but variation occurs with respect to location on the maternal inflorescence and to interaction between light quality and temperature (Cavers and Harper 1966, 1967). Carmona and Murdoch (1995) showed that chemicals used to break seed dormancy (e.g. thiourea, potassium nitrate, and azides) had no effect on *Rumex crispus* seeds under field conditions.

Harper (1977) and Cavers and Harper (1964) reported ecotypic variation in life history characteristics, with plant longevity of *R. crispus* ranging from 1 to 2 or more years. Successful establishment occurred only on open sites or on sites relatively free from interspecific competition. Maun and Cavers (1969, 1970) reported that reproduction in *R. crispus* varies with respect to daylength and temperature, and that the species is capable of flowering under both short- and long-day conditions. Experimental studies of defoliation during anthesis in *R. crispus* had no effect on fruit production (Maun and Cavers 1971). Regeneration of grazed or mowed plants results from growth of meristems near the apex of vertical, underground rootstocks (Healy 1953, Hudson 1955).

Ecological distribution. *Rumex crispus*, *R. conglomeratus*, and *R. pulcher* are reported from waste places, open, disturbed sites, abandoned and cultivated fields (Fernald 1950, Gleason and Cronquist 1991, Holm et al. 1977, Kaul 1986, Munz 1959). *Rumex crispus* has been reported from brackish salt marshes (MacDonald 1988) and coastal prairie (Heady et al. 1988). *Rumex crispus* has been used to revegetate eroding beach dunes in Britain (Walmsley and Davy 1997a, 1997b, 1997c).

Weed status. Curly dock is considered a noxious weed in agricultural or horticultural practice, at least at a global level (Holm et al. 1977), but it is not considered a noxious weed by the State Dept. of Food and Agriculture (Anonymous 1996). Both *R. crispus* and *R. conglomeratus* are listed for the United States in Lorenzi and Jeffery (1987).

Microbial pathogens. *Rumex conglomeratus* has been reported as a host of alfalfa mosaic virus (McKirdy and Jones 1997). Several fungal pathogens have been reported from *Rumex* species, including *Myrothecium roridum* (on *R. crispus*), *Phomopsis emecis* (on *R. pulcher*), *Phomopsis longicolla* (on *R. crispus*), *Uromyces rumicis* (on *R. crispus*), *and Cercospora.* (Hatcher 1996, Morris and Crous 1994, Murakami and Shirata 1998, Roy et al. 1997, Shivas et al. 1994). Black et al. (1996) reported that *Rumex crispus* was resistant to soybean canker disease (*Diaporthe phaseolorum*).

Insect pathogens. *Rumex crispus* is known to be a host of weevils (*Aphion*) and chrysomelid beetles (*Gastrophysa*) (Freese 1995, Hatcher 1996). Interactions between *Gastrophysa* and the rust fungus *Uromyces* have been studied in *Rumex crispus* (Hatcher et al. 1994a, 1994b, 1994c,1995a, 1995b). In general, damage by beetles, in the form of reduced biomass, is reduced by fungal infection, which significantly decreases protein

content of plant tissues. In contrast, plants infested by beetles were less prone to infection by *Uromyces*, which also showed reduced reproductive success. Beetles or fungus alone caused more damage than when both were present.

Herbicide control. No literature was found that specifically addressed herbicide control of *Rumex crispus* or related species. Lorenzi and Jeffery (1987), however, recommended mechanical removal or spot treatment with 2,4-D plus dicamba for low density infestations and sulfometuron or tebuthiuron for large infested areas.

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