Melilotus indicus (L.) All. , Sour Clover and Melilotus albus L., White Sweet Clover (Fabaceae)

Description. Annual, 1.5-7(8) dm tall, erect, glabrous to sparsely appressed-pubescent, the stems with erect to ascending branches. Leaves alternate, petiolate, trifoliolate, leaflets 0.5-2 cm long, obovate to lanceolate-oblong, denticulate to serrulate; stipules deeply and sharply toothed. Inflorescences 1-2 cm long, racemose, terminal or in the upper axils, peduncles 1-3 cm long. Calyx 1-2 mm long, sparsely appressed-pubescent, tubular, lobes 5, ± equal; corollas papilionaceus, 2-3 mm long, pale yellow; stamens 10; ovary superior. Fruits 1.5-4 mm long, ovoid to subglobose, indehiscent, surface faintly reticulate, glabrous; seeds 1-2. In California, flowering from March to August. (Barneby 1989, Clapham et al. 1962, Hansen 1968, Isely 1993, Munz 1959).

Synonym: *M. parviflora* Desf.

The related species, *M. albus* (white sweetclover), differs by having white corollas that are 4-7 mm long, and fruits 3-5 mm long, with reticulated surfaces. White sweetclover has been widely cultivated as a hay crop, as an inter-crop for nitrogen enrichment, as a nectar source for apiculture, and for revegetation purposes (e.g., Burton and DeVane 1992, Fuelleman and Graber 1938, Gebhart et al. 1993, Harman 1992, McEwen and Johnston 1985, Schmidt and Brubach 1993, Walster 1924). Poorly stored sweet clover hay is known to cause serious toxic responses in cattle and horses (Blakley 1985, Hintz 1990).

Geographic distribution. Both *Melilotus indicus* and *M. albus* are native to Mediterranean Europe, but have become naturalized throughout the rest of Europe, warm temperate North America (southern and Pacific U.S.), Chile, Australia, Japan, southern Africa, and Hawaii (Arnold and de Wet 1993, Barneby 1989, Chapman 1991, Gleason and Cronquist 1991, Hansen 1968, Montenergo et al. 1991, Ohwi 1965, Wagner et al. 1990).

Sour clover was reported (under the name *M. parviflora* Desf.) as "common in California" by Brewer et al. (1876). However, Hendry and Bellue (1925) provided evidence that it was present in California prior to the late 1700s. White sweetclover was widely established by the late 1800s (Robbins 1940). Sour clover is found on Santa Barbara Island and all the northern Channel islands and white sweetclover occurs on Anacapa and Santa Cruz islands (Junak et al. 1997). Both species are widespread through most of California (Anonymous 1998, Isely 1993).

Reproductive and vegetative biology. No literature was found that reported on the reproductive and vegetative biology of *Melilotus indicus*. *Melilotus albus* varies with respect to self-incompatibility, is largely outcrossed, and shows some inbreeding depression when selfed (Brink 1934, Hartwig 1942, Proctor et al. 1996). Most species of *Melilotus* are visited primarily by bees (Harman 1992, Johnson 1986, Proctor et al. 1996).

Melilotus indicus is an annual, but *Melilotus albus* typically has a biennial growth form (Barneby 1989, Gleason and Cronquist 1991, Hansen 1968, Faensen-Thiebes 1992, Klemow and Raynal 1981). Seeds of white sweet clover may persist for as long as 14 years in cold temperate climates (Stoa 1933). Several studies have suggested that *Melilotus albus* may have allelopathic effects (Nicollier and Thompson 1982, Schnute 1984).

Ecological distribution. Both *Melilotus indicus* and *M. albus* occur in gardens, roadsides, fields, waste places, disturbed sites, coastal salt marshes, and cultivated fields (Gleason and Cronquist 1991, Hansen 1968, MacDonald 1988, Munz 1959, Wagner et al. 1990). The latter species is known to occur on a variety of soil types, including those initially poor in nitrogen (Fuelleman and Graber 1938, Klemow and Raynal 1981). Miller (1982) reported ecotypic differentiation for zinc tolerance on abandoned mine sites.

Weed status. *Melilotus indicus* is not considered a noxious weed in agricultural or horticultural practice, at least at a global level (not listed by Holm et al. 1977), nor is it considered a noxious weed by the State Dept. of Food and Agriculture (Anonymous 1996). *Melilotus albus* (white sweetclover) and *M. officinalis* (yellow sweetclover) are the only species listed for the United States by Lorenzi and Jeffery (1987).

Microbial and insect pathogens. No literature was found that reported microbial or insect pathogens of sour clover. *Melilotus albus* seeds and seedlings are susceptible to the fungus, *Pythium* (Jackobs 1947). White sweetclover also has been reported as a host for several insects, including moths (Slansky 1989, Waters and Barfield 1989), aphids (Rethwisch and Manglitz 1987), and weevils (Murray and Clements 1994, Soroka and Muir 1995).

Herbicide Control. Dicamba or mixtures of 2,4-D and dicamba were recommended by Lorenzi and Jeffery (1987) for both white and yellow sweetclover. No other literature pertinent to herbicide control was found.

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