

Ohio Invasive Plant Assessment Protocol - 2015

Botanical Name: *Melilotus officinalis*
 Common Name: Yellow sweet clover
 Family Name: Fabaceae
 Assessment conducted by: Allison Mastalerz, Theresa Culley

Step I Outcome: **Invasive**
 Step II Score: **51**
 Step II Outcome: **Invasive**

Team Score

Notes

References

Step I

Directions: Place an "X" in the Score column next to the selected answer to each of the four questions.

1. Is this plant known to occur in the state and listed as "noxious" on any federal or Ohio Department of Agriculture plant list?

Yes. Place on invasive plant list, no further investigation needed. **STOP**
 No. Continue on to question 2.

2. Has this plant demonstrated widespread dispersion and establishment (i.e. high numbers of individuals forming dense stands) in natural areas across two or more regions in Ohio?

Yes. Place on invasive plant list, no further investigation needed. **STOP**
 No. Continue on to question 3.

Species occurs in all 5 regions, but information about individual populations is lacking.

1,7

3. Does this plant form self-replicating populations outside of cultivation in Ohio and is it documented to alter the composition, structure, or normal processes or functions of a natural ecosystem?

Yes
 No
 Unknown

4. Is the plant listed as invasive in an adjoining state or a nearby state east of the Mississippi within the USDA Plant Hardiness zones 5-6?^{b,c}

Yes
 No
 Unknown

MI, WV (considered 'moderately invasive')

4,5

If the answer was yes for both questions 3 and 4, the plant is placed on the invasive plant list and no further research is needed. Stop here. If the answer is no for both questions 3 and 4, the plant is not considered invasive and no further investigation is warranted. Otherwise, proceed to Step II.

Step II: Invasion Status

Directions: Place the appropriate numerical score (or "U") in the Score column next to the selected answer to each of these 18 questions.

1. Current Invasion in Ohio

- plant is not found in natural areas (0 pts.)
- plant is found in natural areas but only because it persist from previous planting in that location (e.g. old home sites) (0 pts.)
- plant is only expanding from sites of previous planting (1 pt.)
- plant occurs in natural areas away from site of planting (3 pts.)
- Information unknown (U)

8

2. State Distributiona

- plant is not naturalized in any region of Ohio (0 pts.)
- plant is naturalized in only one region in Ohio (1 pt.)
- plant is naturalized in two regions in Ohio (2 pts.)
- plant is naturalized in three regions in Ohio (3 pts.)
- plant is naturalized in four regions in Ohio (4 pts.)
- plant is naturalized in five regions in Ohio (5 pts.)
- Information unknown (U)

1,7

3. Regional/US Distribution

- plant is not considered to be a problem in any other state (0 pts.)
- plant has been reported as a widespread problem in another non-neighboring state within the USDA Plant Hardiness Zones 5-6 (1 pt.)
- plant has been reported to be a widespread problem in 1-2 adjoining states (3 pts.)
- plant has been reported to be a widespread problem in 3 or more adjoining states (5 pts.)
- plant has been reported to be a widespread problem in similar habitat outside the US (1 pt.)
- Information unknown (U)

MI, WV (considered 'moderately invasive')

4,5

Step II: Biological Characters

4. Vegetative Reproduction

- no vegetative reproduction (0 pts.)
- reproduces readily within the original site (1 pt.)
- has runners or spreading rhizomes that root easily (3 pts.)
- fragments easily and fragments can be easily dispersed (4 pts.)
- has runners or spreading rhizomes that root easily AND fragments easily and fragments can be easily dispersed (5 pts.)
- Information unknown (U)

8

5. Sexual Reproduction

- no sexual reproduction (0 pts.)
- infrequent sexual reproduction (1 pt.)
- frequent sexual reproduction, but high variation among years in seed production (3 pts.)
- frequent sexual reproduction (one or more events per year) (5 pts.)
- Information unknown (U)

8: Annual or biennial. Seed production varies based on a variety of factors (soil type, weather, competition). 13: In Alaska, species was originally annual but perennality evolved quickly.

8,13

Step II

6. Number of Viable Seeds or Propagules per Plant

- few (0-10) (1 pt.)
- moderate (11-1,000) (3 pts.)
- prolific (>1,000) (5 pts.)
- Information unknown (U)

5 Reports all indicate that an individual plant can produce from 3,000 to over 350,000 seeds. 13: Seeds can remain viable in soil for up to 30 years.

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7. Flowering Period

- one month or less per year (0 pts.)
- two months (1 pt.)
- three to five months (2 pts.)
- longer than five months (3 pts.)
- Information unknown (U)

2 May through September

10

8. Dispersal Ability

- low potential for long-distance seed/propagule dispersal (>1km) (0 pts.)
- medium potential for long-distance seed/propagule dispersal (3 pts.)
- high potential for long-distance seed/propagule dispersal (5 pts.)
- Information unknown (U)

3 8: "Rain and stream flow are probably much more important [than wind] for dispersal." Species is dispersed by animals, especially along trails and livestock corridors. Also dispersed through the transport of contaminated seed or animal feed. 13: Seeds can remain viable in soil for up to 30 years and are often dispersed "from roadside populations onto floodplains at places where roads intersect with river corridors."

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9. Generation Time

- long juvenile period (>5 or more years for trees, 3 or more years for other growth forms) (0 pts.)
- short juvenile period (<5 years for trees, <3 years for other forms) (3 pts.)
- Information unknown (U)

3 Biennial, but can be an annual. Seed production varies based on a variety of factors (soil type, weather, competition)

8,10

10. Establishment

- unable to invade natural areas (0 pts.)
- can only colonize certain habitat stages (e.g. early successional habitats) (1 pt.)
- aggressively colonizes and establishes in edge habitats (3 pts.)
- aggressively colonizes and establishes in intact and healthy natural areas (6 pts.)
- Information unknown (U)

6 Species is known to colonize freshly disturbed sites. In prairies, species occurrence is associated with soil mounds created by wildlife (pocket gophers, badgers, prairie dogs), and trails.

8,10

Step II: Ecological Importance

11. Impact on Ecosystem Processes

- no known effect on ecosystem-level processes (0 pts.)
- moderate effects on ecosystem-level processes (e.g., changes in nutrient cycling) (3 pts.)
- causes long-term, substantial alterations in the ecosystem (e.g., changing fire regime of an area, changing hydrology of wetlands) (6 pts.)

3 Species is a nitrogen-fixing species and can change the nutrient cycling and content of an area. Some contend that this species can create long-term, substantial alterations in the ecosystem, but more data-based conclusions are needed for the 6 point answer. 13: "On Alaska's Matanuska and Stikine River floodplains, low to moderate density of white sweetclover was positively correlated with the exotic species narrowleaf hawkbeard (Crepis tectorum L.) and common dandelion (Taraxacum officinale)." 14: "The legume M. officinalis strongly decreased...light and soil moisture levels."

8,12,13,14,15

12. Impact on Rare Organisms

- no known negative impact on Ohio State-listed or federal-listed plants or animals (0 pts.)
- negatively impacts listed species, such as through displacement or interbreeding (3 pts.)

3 16: Negatively impacts blazing star in OH

16

13. Impact on Native Animals

- no known negative impact on animals (0 pts.)
- documented direct or indirect negative effects on animal taxa (3 pts.)

0

8,10

14. Impact on Native Plants

- no known negative effects on native plants (0 pts.)
- negatively impacts some native plants (increasing their mortality and/or recruitment of certain taxa) (3 pts.)
- impacts native plants to such an extent that community structure is greatly altered (6 pts.)

3 10: "In many prairies, sweet clover is associated with displacement of native species by limiting sunlight and moisture and changing nutrient availability." Also, sweet clover has been associated with reduced abundance of rare riparian plants in Alaska. It's ability to alter the nitrogen content in the soil can lead to community alteration. 14: "The legume M. officinalis strongly decreased the abundance of all other species, species diversity, and light and soil moisture levels." 15: In North Dakota, "The results showed that the relationship between Melilotus and native and exotic species varied depending on the habitat and the year. In Badlands sparse vegetation, there was a consistent, strong, and positive relationship between Melilotus cover and native and exotic species cover suggesting that Melilotus is acting as a nurse plant and facilitating the growth of other species."

10,11,14,15

15. Hybridization

- no known instances of hybridization with other plant species (0 pts.)

- can hybridize with native Ohio plants or commercially-available species, but seeds are inviable (1 pt.)
- can hybridize with native Ohio plants or commercially-available species, producing viable seed (3 pts.)

0

16. Population Density

- occurs only as small, sporadic populations or individuals (1 pt.)
- typically forms small, monospecific patches (3 pts.)
- is a dominant plant in area where population occurs (absolute cover 15-50%) (4 pts.)
- forms an extensive, monospecific stand (absolute cover >50%) (5 pts.)

4

Population densities vary based on climate. During optimal climate conditions, clover can be observed in 15-50% cover.

10,11

17. Role in Succession in Natural Areas

- successional information is unknown (0 pts.)
- is an early successional species that temporarily invades a disturbed site but does not persist as the site matures (0 pts.)
- readily invades disturbed sites and persists, but does not interfere with succession (1 pt.)
- readily invades disturbed sites, persists and interferes with succession of native plants (4 pts.)

1

Species is considered an early to mid-seral plant that does not persist into later seral stages. When fire disturbance is involved (in prairies), species can persist even after multiple burns (in multiple years).

10

18. Number of Habitats Invaded

Forestlands: Floodplain forest, hemlock-hardwood forest, mixed mesophytic forest, beech-maple forest, oak-maple forest, oak-hickory forest.

Grasslands: *Alvar**, *beach-dune community**, *bur oak savanna**, *slough-grass-bluejoint prairie**, *sand barren**, *big bluestem prairie*, *little bluestem prairie (xeric limestone prairie*+)*, *post oak opening**

Wetlands: Bog*, fen*, twigrush-wiregrass wet prairie*, marsh, buttonbush swamp, mixed shrub swamp, hemlock-hardwood swamp*, maple-ash-oak swamp, white pine-red maple swamp*

* Considered a rare plant community in Ohio by ODW's Biodiversity Database Program.

+ = xeric limestone prairies or cedar glades and post oak openings are unique to the Interior Low Plateau Region of Adams, Highland and Pike counties, and are not included in Schneider and Cochrane (1997).

- not found in any natural habitats in Ohio (0 pts.)
- only found in 1 broad category (1 pt.)
- found in 2 broad categories or 2 rare habitat types (3 pts.)
- found in 3 broad categories or 3 rare habitat types (4 pts.)
- found in 4 or more rare habitat types (5 pts.)

4

Occurs in open, disturbed sites, but also can flourish in prairies, savannas, meadows and dunes. Also occurs in riparian areas, especially calcareous riverside seepage communities and fens.

8,9,10

Total Score:

51

Number of Unknowns:

0

Outcome:

Invasive

Total Points	Assessment Decision
4 or more U	Insufficient Data
0-34	Not Known to be Invasive
35-44	Pending Further Review
45-80	Invasive