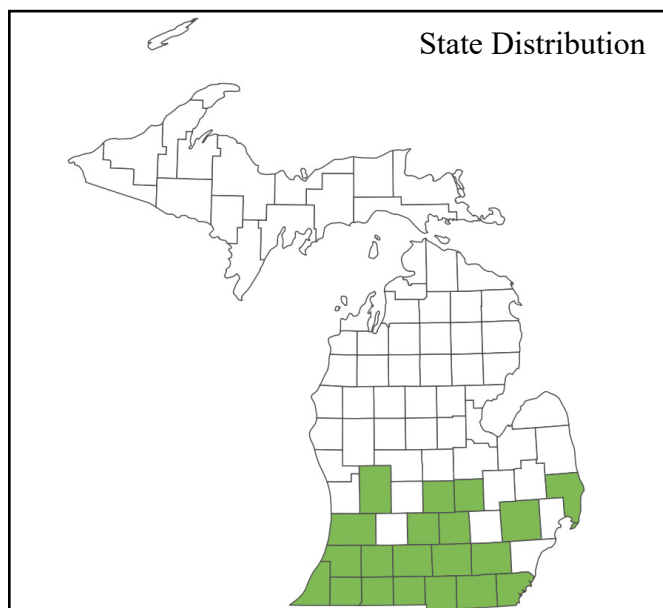




Photo by Brad Slaughter



Best Survey Period



Status: State Threatened

Global and state rank: G4 (Globally Apparently Secure) / S3 (State Vulnerable)

Other common names: prairie false indigo, white wild indigo

Synonyms: *Baptisia alba* (L.) Vent. var. *macrophylla* (Larisey) Isely, *Baptisia leucantha* Torr. & A. Gray

Family: Fabaceae (Leguminosae)

Sub-Family: Faboideae

Taxonomy: Fabaceae (also known as Leguminosae) is one of largest, most complex, and important plant families in the world. It is divided into several subfamilies and tribes with the genus *Baptisia* belonging to the subfamily Faboideae and the tribe Sophoreae (Stevens 2017). The taxonomy of *Baptisia lactea* (white false indigo) is complex, due to disagreements over differing origins, collections, and accepted authorities. There are several synonyms that are often seen in the literature, and the two most common are *B. alba* var. *macrophylla* and *B. leucantha*. We follow Reznicek et al. (2011) in recognizing this plant as

Baptisia lactea. More specifically, our plants are *B. lactea* var. *lactea* (Raf.) Thieret (Turner 2006).

Total range: White false indigo is a prairie species found in the various plains of the Midwest and southern United States. It can be found as far southwest as Texas, north to Nebraska, northeast to Minnesota, east to Michigan, and south to Mississippi. It is also slightly disjunct in two states further to the east: New York and Maryland. It is ranked as Vulnerable (S3) in Michigan, Minnesota, Nebraska, and Kansas. In Indiana, it is ranked Apparently Secure (S4). In the remaining states, it has not been ranked within this ranking system, possibly due to taxonomic ambiguity (NatureServe 2024, MNFI 2024a). In Ohio, its status is Potentially Threatened (Ohio DNR 2022).

State distribution: The native range of white false indigo is not straightforward because some records are believed to have originated from plantings or lack sufficient information to discount this possibility. The species appears to be native in at least eleven southwestern Michigan counties: from Berrien east to Hillsdale, north to Jackson, west to Van Buren, and north to Kent. Ingham, Wayne, and St. Clair County records are old and ambiguous.



Records from all other counties may be non-native occurrences (Reznicek et al. 2011, MNFI 2024a). There are 84 element occurrences in the Michigan Natural Heritage Database. Two are unranked because they are believed to have originated from plantings. Of the remaining 82 occurrences, 34 are believed extant. Viability has been assessed for 28 of these occurrences, all of which are ranked from B to D (i.e., good to poor estimated viability). Of the 48 occurrences that are not believed to be extant, 23 are considered Historical and have not been documented since 1966 or earlier. Four more have been documented more recently than that but are ranked Failed to Find due to subsequent unsuccessful surveys. Another 21 are ranked Extirpated. Overall, the data indicate a decline in occurrences. Only three element occurrences exist with moderate to large populations and quality habitat. The rest consist of small populations or individual plants that are in marginal or degraded habitat (MNFI 2024a). White false indigo has most recently been found in St. Joseph County (2017), and Kent County (2023), although the latter discovery was of a prairie planting installed by MDOT (MNFI 2024a).

Recognition: White false indigo is a large, bushy, perennial forb that can range from 1-2 m in height. Its flowers are white, 2-2.5 cm long, and typical of the Faboideae subfamily; they exhibit a papilionaceous or butterfly-like form with a prominent banner petal, two wing petals, fused keel petals, and diadelphous stamens with one free stamen and the other nine fused to one another. Flowers grow on large, showy racemes that can reach 20-45 cm in length. Plants tend to bloom from late May through July and fruits mature around August or September. Fruits are a 5 cm-long legume that begins green and matures black. Legumes also droop with age. The stems and leaves are glabrous and can range from green to dark purple in color with a glaucous aspect (i.e., a waxy bloom). Leaves are trifoliolate, and the leaflets are elliptic in shape with smooth margins that can range from 2.5-5 cm long and 0.8-1.3 cm wide (Wilhelm and Rericha 2017, Hilty 2018).



The leaves bear stipules, but they are relatively inconspicuous. The root system consists of a single, massive taproot (MNFI 2024b, Reznicek et al. 2011, Voss 1985). Plants do form rhizomes and may reproduce vegetatively (Hilty 2018).

White false indigo is easy to distinguish from other *Baptisia* species in Michigan as it is the **only *Baptisia* with both white-colored flowers and glaucous stems and leaves**. The flowers of *B. tinctoria* (wild indigo) are yellow and its leaflets are shorter (0.6-2.3 cm) than the leaflets of both white false indigo and *B. leucophaea* (cream wild indigo) which can reach 2.5-5 cm. The floral and vegetative parts of white false indigo are similar to those of cream wild indigo, but the stems and leaves of cream wild indigo are pubescent while those of white false indigo are glabrous. An adventive species originating from the southern United States, *B. australis* (blue false indigo), has



been found in Michigan, but it can be distinguished from Michigan's other native *Baptisia* species by its bright purple-blue flowers (Reznicek et al. 2011).

Best survey time/phenology: White false indigo is distinctive, even when not in flower or fruit, due to its thick, glaucous, trifoliate leaves. The optimal survey period is from the first week in June to the fourth week of August (MNFI 2024a,b).

Habitat: White false indigo occurs naturally in a variety of prairie and savanna habitats, ranging from dry to wet-mesic conditions. It can also occur along open roadsides, railroads, fencerows, and riverbanks. There are several Michigan natural communities in which white false indigo has been documented or in which it likely occurred historically: bur oak plains, dry southern forest, dry-mesic prairie, dry-mesic southern forest, mesic prairie, mesic sand prairie, oak barrens, oak openings, wet prairie, wet-mesic prairie, and wet-mesic sand prairie. (MNFI, 2024a,b; Reznicek et al. 2011)

Associated species include black oak (*Quercus velutina*), white oak (*Q. alba*), black cherry (*Prunus serotina*), pignut hickory (*Carya glabra*), smooth sumac (*Rhus glabra*), sassafras (*Sassafras albidum*), leadplant (*Amorpha canescens*), northern dewberry (*Rubus flagellaris*), big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), cordgrass (*Spartina pectinata*), poverty oat grass (*Danthonia spicata*), bracken (*Pteridium aquilinum*), round-headed bush-clover (*Lespedeza capitata*), tall tickseed (*Coreopsis tripteris*), flowering spurge (*Euphorbia corollata*), common spiderwort (*Tradescantia ohiensis*), butterfly weed (*Asclepias tuberosa*), wild-bergamot (*Monarda fistulosa*), prairie coreopsis (*Coreopsis palmata*), wild geranium (*Geranium maculatum*), pale-leaved sunflower (*Helianthus strumosus*), false boneset (*Brickellia eupatorioides*), rosin weed (*Silphium integrifolium*), yellow-pimpernel (*Taenidia integerrima*), prairie violet (*Viola pedatifida*), golden alexanders (*Zizia aurea*), prairie dock



(*Silphium terebinthinaceum*), and rattlesnake master (*Eryngium yuccifolium*) (MNFI 2024b). It can also be found in association with weedy species when found in plantings or in degraded natural community remnants (MNFI 2024a).

Biology: White false indigo plays an important role in tallgrass prairie ecology. As a legume, it contains nitrogen-fixing nodules in its roots which make atmospheric nitrogen bioavailable to other plant species (Mundahl 2014). It is also an important food source to many pollinator bumblebee (*Bombus*) species (Haddock and Chaplin 1982), as well as other insects, some of which are conservative species of prairies and oak barrens (Wilhelm and Rericha 2017). When pollinated flowers mature into fruits, individual plants can engage in the selective abortion of damaged and/or few-seeded fruits to limit the plant's investment in seeds that are unlikely to germinate. A factor



leading to fruit and seed damage is herbivory from species such as the indigo weevil (*Trichapion rostrum*) (Mundahl 2014). Selective fruit abortion and fruit predation are both detrimental to the reproductive success of white false indigo as the species appears to primarily spread through sexual reproduction and seed dispersal (Haddock and Chaplin 1982). In addition to insect herbivory, white false indigo is susceptible to predation from large herbivores, primarily white-tailed deer. To combat mammalian herbivory, plants contain several alkaloids which are toxic to ungulates, and livestock have died from eating *Baptisia*. These alkaloids are toxic to people as well and can cause gastrointestinal distress. These toxic properties, however, have also been utilized medicinally by indigenous peoples of America (Kupchan and Dahle 1961).

Conservation/management: Conservation of remnant prairies and barrens is imperative to the survival of white false indigo in Michigan. Most of the prairies in Michigan have been plowed and converted to agricultural fields, and the prairies that remain are under the constant threat of anthropogenic disturbances as well as vegetative succession toward closed-canopy conditions. Natural hydrological and disturbance regimes must be protected and reinstated where they have been eliminated (Slaughter 2009, MNFI 2024b).

Fire suppression has also contributed to the decline of suitable habitat, and therefore the decline of white false indigo itself. Prescribed burns and mechanical removal of woody plant species could benefit white false indigo by halting woody encroachment and limiting competition. While white false indigo does not appear to benefit directly from fire, i.e. an increase in growth or reproductive output, it is considered fire tolerant and is unaffected by regular burns (Curtis and Partch 1948, Slaughter 2009, MNFI 2024b).

Other threats to white false indigo include anthropogenic disturbances such as the maintenance of road, railroad, and utility rights-of-way (ROWs) which can involve the application



of herbicide, mowing, and bulldozing. These types of repeated disturbances not only harm plants, but also encourage encroachment from invasive species such as smooth brome (*Bromus inermis*), spotted knapweed (*Centaurea stoebe*), Kentucky bluegrass (*Poa pratensis*), and autumn olive (*Elaeagnus umbellata*) (Slaughter 2009, MNFI 2024a). Plants have also been poached from parks and preserves accessible to the public. The showy flowers of this species may tempt gardeners and bouquet-seekers to illegally harvest it from protected areas.

White false indigo has been documented in the landscape where it does not natively occur, as it is often a component of prairie plantings (MNFI 2024a). Land managers should select planting mixes carefully, as planted occurrences of rare species can be confused for natural occurrences, leading to costly unwarranted protection. In any case, managers should keep careful planting



records.

Comments: Members of the genus *Baptisia* are commonly known as wild or false indigo due to their use by early Americans as a blue dye (Chicago Botanic Garden 2024). In fact, the origin of the genus name comes from the Greek word “baptizein” which means “to dye” (Gray and Fernald 1950). White false indigo is also known to hybridize with *B. tinctoria* var. *crebra* in Indiana, and the hybrid species is known as *Baptisia x deamii* (Larisey 1940).

Research needs: White false indigo and its habitat are rare and declining in Michigan. To prioritize conservation and management of what remains, a statewide status survey of known EOs seems warranted. The response of this species to management techniques such as invasive species treatment, various degrees of canopy thinning, and varying frequencies and seasonal timings of prescribed fire should be experimentally determined. Because this species has lost suitable habitat due to canopy closure, its longevity in the seedbank and ability to re-express itself from the seedbank when favorable conditions return should be determined.

Related abstracts: Bur oak plains, dry southern forest, dry-mesic prairie, dry-mesic southern forest, mesic prairie, mesic sand prairie, oak barrens, oak openings, wet prairie, wet-mesic prairie, wet-mesic sand prairie, leadplant, prairie coreopsis, false boneset, rosin weed, and rattlesnake master.

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