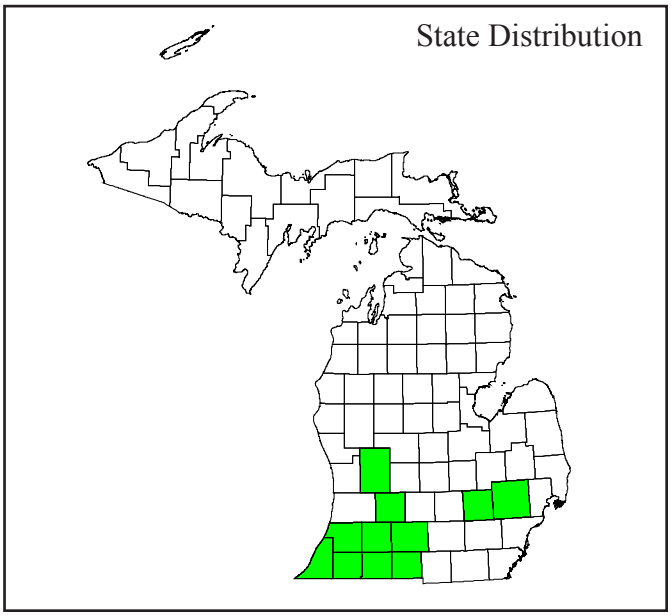
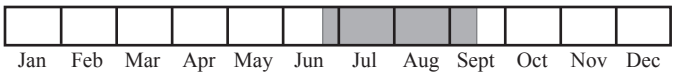
Amorpha canescens Pursh — leadplant



Best Survey Period



Status: State special concern

Global and state rank: G5/S3

Other common names: lead-plant, downy indigobush

Family: Fabaceae (pea family); also known as the Leguminosae.

Synonym: *Amorpha brachycarpa* E.J. Palmer

Taxonomy: The Fabaceae is divided into three well known and distinct subfamilies, the Mimosoideae, Caesalpinioideae, and Papilionoideae, which are frequently recognized at the rank of family (the Mimosaceae, Caesalpiniaceae, and Papilionaceae or Fabaceae, respectively). Of the three subfamilies, *Amorpha* is placed within the Papilionoideae (Voss 1985). Sparsely hairy plants of leadplant with greener leaves have been segregated variously as *A. canescens* var. *glabrata* Gray or *A. canescens* Pursh f. *glabrata* (A.Gray) Fassett, though given the wide variation in pubescence such variants may not merit recognition.

Range: Leadplant is a widely distributed species primarily of the central United States, occurring in the north from southern Michigan and Ontario west to Manitoba and Saskatchewan, ranging south in the Mississippi valley through Arkansas to Texas and in the western Great Plains from Montana south through Wyoming and Colorado to New Mexico. It is considered rare in Arkansas and Wyoming and is known only from historical records in Montana and Ontario (NatureServe 2006).

State distribution: Of Michigan's more than 50 occurrences of this prairie species, the vast majority of sites are concentrated in southwest Lower Michigan, with Kalamazoo, St. Joseph, and Cass counties alone accounting for more than 40 of these records. Single outlying occurrences have been documented in the last two decades from prairie remnants in Oakland and Livingston counties in southeast Michigan.

Recognition: Leadplant is an **erect, simple to sparsely branching shrub ranging up to ca. 1 m in height**, characterized by its **pale to grayish color** derived from a close pubescence of whitish hairs that cover the plant throughout. The leaves, which are alternative and pinnately compound, have short, 1-3 mm long petioles, and from 13-20 pairs of leaflets that are **densely pubescent and either lack glands beneath or bear them very inconspicuously**. Plants are terminated by **dense, narrow, spike-like racemes of purplish flowers that bear a hairy calyx and develop small, hairy fruits** comprised of 1-2 seeded pods. *Amorpha*

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fruticosa, a non-native species known in several southern Michigan counties, has a similar inflorescence but is a much more robust, branching shrub ranging up to ca. 4 m in height, and can be easily distinguished by its woody habit, the mostly smooth leaflets that are conspicuously gland-dotted beneath, and flowers that have a smooth calyx and a conspicuously glandular, smooth fruit.

Close-up of inflorescence

Best survey time/phenology: Although fairly distinctive in sterile condition, leadplant could be confused by surveyors with some superficially similar legume species and is thus best sought during the relatively long flowering and fruiting period, which occurs from approximately late June through about mid-September.

Habitat: Leadplant is an upland species occurring primarily in dry sand prairies, hillside prairies, and remnant oak barrens where it is typically associated with such dominant prairie grasses as *Schizachyrium scoparium* (little bluestem), *Andropogon gerardii* (big bluestem), *Sorghastrum nutans* (Indian grass), *Stipa spartea* (needle grass), and *Leptoloma cognatum* (fall witchgrass). Common woody plant associates include *Ceanothus americanus* (New Jersey tea), *Salix humilis* (prairie willow), Rhus spp. (sumac), *Sassafras albidum* (sassafras), *Quercus velutina* (black oak), *Quercus alba* (white oak), and *Carya glabra* (pignut hickory). Typical forbs include such species as *Euphorbia corollata* (flowering spurge), *Monarda fistulosa* (beebalm), *Tradescantia ohioensis* (Ohio spiderwort), *Asclepias tuberosa* (butterflyweed), *Lespedeza capitata* (prairie bush clover), *Liatris aspera* (blazing star), *Phlox pilosa* (hairy phlox), *Heuchera* spp. (alum root), *Frasera caroliniensis* (American columbo), *Ratibida pennata* (pale coneflower), *Aster laevis* (smooth aster), *Solidago rigida* (stiff goldenrod), *S. speciosa* (showy goldenrod),), *Silphium terebinthinaceum* (prairie dock), *Veronicastrum virginicum* (Culver's root), *Taenidia integerrima* (yellow-pimpernel), *Lupinus perennis* (lupine), and *Vernonia missurica* (ironweed), among many other prairie taxa including several Michigan rarities (see examples among related abstracts).

Swink and Wilhelm (1994) note leadplant as one of the few prairie shrubs of the Chicago region, where it was once common in dry to mesic prairies. Typical associates in this area include such species as flowering spurge, *Petalostemum purpureum* (prairie clover), *Asclepias viridiflora* (green milkweed), *Bouteloua curtipendula* (side-oats grama grass), *Stipa spartea* (porcupine grass), big bluestem, *Dodecatheon meadia* (shooting star), and *Viola pedatifida* (prairie violet).

Biology: Leadplant is a perennial shrub and an important component of prairie grasslands, often comprising a significant portion of aboveground biomass (Johnson and Anderson 1986). As a legume and therefore a potential nitrogen-fixer, leadplant plays a vital role in the functioning of tallgrass prairie ecosystems where nitrogen can be a limiting factor for other species (Coppedge et al. 1998). The role of fire in maintaining prairie communities is well known, and the beneficial effects of fire on leadplant are documented in numerous studies (Gibson 1988, Towne and Owensby 1984, Abrams and Hulbert 1987, Tester 1996, Towne and Knapp 1996, Coppedge et al. 1998). In Michigan leadplant is the obligate larval food plant for two state endangered insect species, *Schinia lucens* Morrison (leadplant flower moth) and *Catocala amestris* Strecker (three-staff underwing). *Schinia lucens* is documented from only one site in St. Joseph County and via a published report (without apparent specimen documentation) for Newaygo County. *Catocala amestris* is known only from one site in Barry County.

Conservation/management: All Michigan records of leadplant are occurrences within small patches of dry sand prairie or prairie grasslands and remnants of oak barrens, savannas, and hillside prairies. This species was undoubtedly much more common and wide-ranging prior to European settlement and has suffered severe impacts as Michigan's grasslands and barrens communities were converted and severely fragmented. In addition, the loss of landscape and anthropogenic processes that maintained these communities, such as natural wildfires and the use of fire as a management tool by Native Americans, has ultimately led to canopy closure where habitat was not converted or destroyed. Leadplant has thus been restricted to relatively small remnants in former prairie-savanna regions, including disturbed grasslands and openings along roadsides and other types of rights-of-way where it is unlikely to be viable over the long term.

Restoration management through prescribed burning, the control of invasive species, and similar efforts will be required to perpetuate this species and its habitat. Conservation planning should be an important component of all management and restoration efforts in order to optimize the size of prairie patches and enhance the viability of leadplant colonies. Active management is taking place in several Michigan prairies which will help sustain leadplant populations, including sites within state parks and recreation areas and also in state game areas. Management of a colony of leadplant in Barry County, employing brush removal, herbiciding, and burning, has been implemented to perpetuate the state's sole site for three-staff underwing.

Comments: Cronquist (1991) notes the occurrence of a rare hybrid between *A. canescens* and *A. fruticosa* (*A.* X*notha* E.J. Palmer). This hybrid is of potential occurrence in Michigan owing to the presence of the non-native *A. fruticosa* in at least one county where *A. canescens* occurs. The specific epithet *canescens* references the pale, grayish color of leadplant due its pubescence, which is composed of a dense covering of close, whitish hairs.

Research needs: While there is an abundant literature on the general ecology of leadplant, particularly with regard to its role in prairie grasslands and the well known beneficial response to prescribed fire management, there is little detailed information on life history or demography, and thus virtually any population biology and genetic study would provide information relevant to managing and maintaining this species.

Related abstracts: Dry sand prairie, prairie smoke, Alleghany or sloe plum, Leiberg's panic grass, dusted skipper, Karner blue, leadplant flower moth, Persius duskywing, Ottoe skipper

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