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## Diversity of *Lamium* (Lamiaceae) in Arkansas, Including Occurrences of *Lamium hybridum* and Flower Color Forms

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Two species of *Lamium*, *Lamium purpureum* L. and *Lamium amplexicaule* L., are common throughout Arkansas (Smith, 1988). We are reporting a third species, *Lamium hybridum* Vill., which has been found at several locations in the state.

The epithet suggests a hybrid origin of this taxon, and various authors have regarded it as originating from *L. purpureum* and either *L. amplexicaule* or some other species (Fernald, 1970; Gleason, 1952; Tutin et al., 1972). Little and Warburg (1953) found the balance of evidence against this hypothesis and pointed out that when *L. hybridum* seeds germinated none of the progeny show characteristics intermediate between those of *L. purpureum* and *L. amplexicaule*. Jones and Jones (1965) reported that artificial crosses between *L. purpureum* and *L. amplexicaule* were unsuccessful. They also constructed a hybrid index in an area where both *L. purpureum* and *L. amplexicaule* had been growing together for several years and found that no individuals showing characteristics of a hybrid were present.

In the field, *L. hybridum* can easily be distinguished from *L. purpureum* and *L. amplexicaule* by leaf characteristics. The leaves of *L. hybridum* are somewhat similar to those of *L. purpureum*, but the blades are distinctly notched, not merely toothed. The upper leaves of *L. purpureum* and *L. hybridum* have petioles, whereas the upper leaves of *L. amplexicaule* do not. *L. purpureum* has a ring of hairs inside the base of the corolla. *L. hybridum* and *L. amplexicaule* lack this characteristic.

Other distinctions have been made between the three species in the laboratory. While *L. purpureum* and *L. amplexicaule* have a haploid chromosome number of nine, *L. hybridum* has a haploid chromosome number of eighteen, making it a possible allopolyploid (Taylor, 1991). Taylor's enzyme electrophoretic analysis of the three species indicates that if *L. hybridum* is of hybrid origin then *L. purpureum* is likely to be a parent, but *L. amplexicaule* is not. He has also compared the anthocyanins that occur in the three species. The anthocyanins of *L. hybridum* were found to be more closely related to that of *L. purpureum* (Taylor, 1991).

Our cursory investigation of the pigments in the three species supports a closer relationship between the pigments found in *L. purpureum* and *L. hybridum* than those found in *L. amplexicaule*. Pigments were extracted from plants of the three species using hot water. The extracts were then scanned in a Cary 50 ultraviolet spectrophotometer. The

resulting absorption curves for the three species showed a closer relationship between the pigments of *L. purpureum* and *L. amplexicaule* than those of *L. hybridum*.

Populations of *L. hybridum* have been found in five counties in Arkansas. Voucher specimens from each of these counties were deposited in the Henderson State University Herbarium (HEND). *D. L. McDaniel 290* was collected in Midway in Hot Spring County. *D. W. Smith 107* was collected in Hempstead County. *Haley 027* was collected in Garland County north of Hot Springs on Highway Five and was associated with both *L. purpureum* and *L. amplexicaule*. *Marsh 9604* was also collected in Garland County and was associated with *L. amplexicaule*. *Marsh 9468* was collected at the Lower Dam Recreation Area at Lake DeGray in Clark County, and *Marsh 9490* was collected at the Highway 7 Ouachita River Access also in Clark County. *Marsh 9612* was collected in Nevada County. In all locations, except the one site in Nevada County, *L. hybridum* was associated with at least one other species of *Lamium*.

*Lamium hybridum* seems to be the same taxon that some sources designate *L. purpureum* var. *incisum* (Willd.) Pers., and Kartesz (1994) adopts this usage with the notation "auct. non Vill." attached to the synonymized binomial. Our review of the literature and field studies lead us to disagree with this interpretation, and we conclude that *L. hybridum* is a well-defined species. It is distinguished from *L. purpureum* by chromosome number as well as morphological characters, and it occurs in populations that are extensive and distinctive. It frequently occurs sympatrically with *L. purpureum* with no intermediates between the two taxa. *L. hybridum* is probably widespread but often overlooked because of its superficial resemblance to *L. purpureum*.

Variation in the flower color of *L. amplexicaule* and *L. purpureum* was also observed during field investigations. Dwight Moore (1941) reported the white-flowered form of *L. amplexicaule* in Arkansas and designated it as *Lamium amplexicaule* forma *albiflorum*. This form reportedly not only had white flowers but lacked the red pigment throughout the stem and leaves (Moore, 1941). Smith (1988) states that the white-flowered form is scattered throughout Arkansas. We have found this form only in two locations in Malvern, in Hot Spring County. *Marsh 9492* was collected at Centennial Park, where *L. amplexicaule* forma *albiflorum* occurs as a substantial population. The other site, consisting

of only a few plants, is in Malvern in a city park off Highway 270. *L. amplexicaule* forma *albiflorum*, *L. amplexicaule*, *L. hybridum*, and *L. purpureum* were all observed at this location.

*Lamium purpureum* occurs in three different color forms. Besides the normal dark purple coloration of the top leaves and flowers, a form also exists that has pale pink flowers and less purple coloration in the stem and leaves. We will informally refer to this as the pastel form. The pastel form, as well as the white-flowered form, occurs in distinct patches among the normal purple form. The white-flowered form of *L. purpureum* has been previously reported in Washington County (Smith, 1988). We are reporting several more locations for this form. T. Fulmer found two sites for the white-flowered form in Clark County. One site is at the Lower Dam Recreation Area at Lake DeGray. The other site in Clark County is on the northern end of the Ouachita Baptist University campus. The authors found the white-flowered form of *L. purpureum* in Little Rock at the corner of Cedar Hill and Brookwood in Pulaski County. At this location all three color forms were present. *Haley 025*, a voucher specimen of the pastel form, and *Haley 026*, a voucher specimen of the white-flowered form, were collected at this location. The white-flowered form also lacks the purple pigment in the stem and leaves. The stem and leaves have a yellowish color.

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