A NEW HEDGE-NETTLE (STACHYS: LAMIACEAE) 
FROM THE INTERIOR HIGHLANDS OF THE UNITED STATES, 
AND KEYS TO THE SOUTHEASTERN SPECIES 

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ABSTRACT 

A new and geographically restricted species in the “hedge-nettle” genus, Stachys (Lamiaceae), is described from the Interior Highlands of the United States, as Stachys iltisii, from Arkansas and Oklahoma. Two keys are provided for distinguishing the Southeastern hedge-nettles. 

ZUSAMMENFASSUNG 

Eine neue Art in der Ziest-Gattung (Stachys, Lamiaceae), mit kleinräumiger Verbreitung im Inneren Hochland von Arkansas und Oklahoma, wird beschrieben: Stachys iltisii. Zwei Schlüssel dienen zur Bestimmung der Ziest-Arten aus der südöstlichen USA. 

Stachys is one of the larger genera within the Lamiaceae, comprising nearly 300 species, and nearly cosmopolitan, absent from Australasia. Its centers of species diversity include warm-temperate portions of western Asia and the Mediterranean, southern Africa, and portions of North and South America (İlçim et al. 2008). The genus in North America, north of Mexico, contains about 45 species, particularly concentrated west of the Rocky Mountains (especially the Pacific states) and in the east, along the Atlantic seaboard states and in the Appalachian region. Southeastern species occur in a wide variety of habitats, most often in mesic sites, and at a broad range of elevations. The North and South American species were studied in detail by Epling (1934); Mulligan and Munro (1989) provide a comprehensive assessment of the North American taxa north of Mexico. Ongoing studies in the genus show that an additional species should be recognized. 


Species propria, haec planta est abundanter glandulifer-pubens in lateribus caulium et in angulis, atque folia pubentissima sunt. Caules et folia, contusi, redolent muschate. Est similis S. eplingii, sed differt quod habet maiora aliquanto tenuiora folia quae inferiore pagina tam glandulifera non sunt, et quod habet flores paulo minores, haec plerumque compactiora in verticillis aggregatior. Crescit in Oklahoma et Arkansase. 

Potentially robust perennial herbs to 1 m tall or taller from vigorous, pale, fragrant rhizomes, often in dense colonies; stems erect, occasionally branched, older plants commonly branched; stem sides and angles densely pubescent with a mixture of glandular and eglandular hairs, the glandular hairs capitate, the eglandular hairs with 3 or more cells, to 3 mm long, spreading and reflexed; leaves spreading, somewhat lax, densely pubescent on both surfaces with glandular and eglandular hairs, the latter mostly appressed on upper surface, and erect on lower surface, the lower surface equipped as well with scattered sessile (or nearly sessile) capitulate glands; the crushed leaves with a musky walnut-spice-fish scent; mid-stem leaves 4–6 cm broad, 10–17 cm long, commonly lyrate basally, featuring a somewhat narrowed waist, with distally convex margins; inflorescences commonly elongated at maturity (fruiting), the lowest and oldest several verticils usually slightly separated, the more distal and younger verticils more or less crowded together, thus nearly compact; cymules each with 6–8-flowers, the verticils thus 12–16-flowered, mostly (turbinate)-hemispheric to nearly spherical; open flowers are visited by a variety of insects, including hon-
eybees, small bumblebees, and wasps; calyces campanulate, densely pubescent with glandular and eglandular hairs, tube (3.2–)3.8–4 mm long, the lobes less than one-half the length of the tube, 1.5–2 mm long, deltoïd, minutely apiculate; corollas pink, 11–11.5 mm long from base to tip of galea, galeae frequently notched or indented apically; the lower lip generally declined 90° at full anthesis, more so with age, 6 mm long, featured prominent pink-purple blotches and spots on adaxial surface; corolla tube prominently saccate toward base on lower side, internally glabrous, but with prominently slanting (oblique) annulus, this copiously pubescent with soft, bulbous trichomes; mericarps 1.5 mm wide, 1.5–1.6 mm long, dark brown, irregularly and minutely verrucose.

Stachys iltisii is endemic to the Interior Highlands of Arkansas and Oklahoma. The oldest known collection is that made by E. J. Palmer in 1920, from Izard County, Arkansas, which represents the eastern-most location for this plant. Its first recognition in the literature was made by Epling (1934), who considered it, additionally known by then from collections in Oklahoma, as a thin-leaved and unnamed variant of Stachys nuttallii Shuttlew. ex Bentham. Fernald (1950), despite considerable disagreement with Epling’s assessments on Stachys in general (1943), concurred that the plants of the Interior Highlands belong in S. nuttallii, as did Gleason (1952). Hugh Iltis (WIS) by way of annotation on the original label of his #5374 (BRIT) from Magazine Mountain, Logan County, AR on 9 Jun 1955, suggested that these plants rightly constitute a recognizable entity within S. nuttallii, offering “ssp. arkansas” for it. Nelson and Fairey (1979) essentially concurred with Epling in recognizing these plants as distinctive within the S. nuttallii complex, but maintained them as being a part of a distinctive and new taxon, S. eplingii; they treated the plants of the Interior Highlands as forming the western (and disjunct) end of the range of S. eplingii (the eastern distribution consisting of primarily Appalachian portions of West Virginia, Virginia, Maryland, District of Columbia, and historically, North Carolina). The somewhat conservative approach to the taxonomic status of these plants taken by Nelson and Fairey at the time is evident within the protologue of their description of S. eplingii: they list (1979, p. 493) three specimens from Arkansas as paratypes for S. eplingii (Demaree 17743 from Logan County, Miller 187 ... “Smith” was used for this collection, but in error... from Montgomery County, Iltis 5175 from Polk County). Their listing these paratypes for a different taxon has no bearing on the matter at hand, and these three collections presently serve as paratypes for S. iltisii (see above).

This taxonomic position was maintained by Nelson (1981), and by Mulligan and Munro (1989; whose formulation is the most recent treatment for all the North American species of Stachys), by Gleason and Cronquist (1991), and finally by Smith (1994).

Recent field investigation in Arkansas and Oklahoma (during one of the hotter and stormier, lightning-filled summers on record, 2007) and study of considerably more herbarium material since 1979 reveals that the opinion expressed by Epling and Iltis was legitimate, at least in the sense that the plants of the Interior Highlands are distinctive within the S. nuttallii “complex.” There is no question that these plants share many features with S. eplingii, and the two entities are surely related. Substantial differences between these two species are apparent, and based on more recent collections, it is obvious that the two taxa can be consistently separated, both from fresh material, and from herbarium specimens. Both species bear short-stalked, capitulate glands on the abaxial leaf surface, with unicellular, spheroidal heads, 25–30 μm in diameter. The lower leaf surface of S. iltisii is sparingly glandular, while that of S. eplingii is densely and prominently atomiferous-glandular (Fig. 1), to the point of having a somewhat shiny, golden surface (with magnification) below the non-glandular pubescence, as well as often leaving something of a yellowish, slightly oily stain on newspapers when pressed. The leaf blades of S. iltisii are longer, broader, and somewhat thinner in texture than those of S. eplingii. Additionally, the leaf blades of S. iltisii are frequently somewhat narrowed in the lower third, thus somewhat lyrate, and widest toward the middle. Stachys eplingii has more ovate leaves, usually widest in the lower third. In S. iltisii, the apex of the early blooming stem is relatively delicate and somewhat flexuous, while that in S. eplingii is stiffer. The fruiting inflorescence of S. iltisii is commonly compact, 1.5–2cm between the lowest verticils, whereas that of S. eplingii commonly exhibits more space, (2–)3–4cm between the lowest verticils.

Stachys eplingii is found in boggy places within the Appalachians. Its most common habitat from West Virginia into northern Virginia includes wet, saturated meadows. Stachys iltisii is generally found in upland forested habitats, commonly on thin soil of rocky places, in both the Ozark Plateau and the Ouachita Mountains, thus on both sides of the Arkansas River Valley, though probably more widely distributed in the Ouachitas. Although substantial differences in geology and soil types exist between the Ozark Plateau and the Ouachitas, sites occupied by S. iltisii do not appear to be unusual or particularly special, and in fact,
open roadsides tend to make excellent habitat for it, where it frequently grows with weedy plants such as Coronilla varia, Daucus pusilla, and Ambrosia trifida. Common woody associates, in less disturbed sites include Quercus alba, Acer rubrum, Robinia pseudo-acacia, Juglans nigra, Ostrya virginiana, and Sassafras albidum. Nearly every population located during this field effort grew with Toxicodendron radicans, Parthenocissus quinquefolia, and Rubus occidentalis.

An overview of biological endemism in the Interior Highlands is not the purpose of this paper. This subject has been amply addressed for a considerable number of plants and animal species, and is discussed in the recent literature; Robison and Allen (1995) provide a useful summary. Zollner et al. (2005) provide an enumeration of the vascular plant taxa endemic to the Interior Highlands (24 species plus 12 subspecies or varieties of more widely distributed species). Vicarious distributions of plant taxa between the Interior Highlands and the Appalachians have been long recognized: Steyermark (1934) lists 87 vascular taxa of the Ozark Plateau that also occur in the southern Appalachians. “Classic” examples include the distributions of Magnolia tripetala, Cladrastis lutea, Robinia pseudo-acacia, and perhaps Halesia carolina (Little 1970). The common notion regarding disjunction of the same species, or of two related species, presumes some probable interconnection in the past (Hardin & Cooper 1967), followed by potential evolutionary divergence. Vicariance and subsequent speciation has been demonstrated for fish species forming species “pairs” in the Ozarks and the Appalachians (Strange & Burr 1997), and various examples exist for vascular plants, such as Castanea ozarkensis and C. pumila. In the case of Stachys iltisii and S. eplingii, such potential commonality of distribution no longer exists, and the two entities are now fully separated. Approximately 1000 km (640 mi) currently separate their nearest points of distribution. Based upon the isolation of the plants within the Interior Highlands from all other related hedge-nettles, and upon the ease of separating plants based on simple morphology, Stachys iltisii is here recognized and described at the level of species.

Personnel within the Arkansas Natural Heritage Commission (2005) list Stachys iltisii as S. eplingii (thus following Nelson & Fairey 1979), and have assigned its state rank as “INV” (Inventory Element, “of conservation concern”). The Oklahoma Natural Heritage Inventory (2003) similarly maintains S. iltisii as S. eplingii, tracking it as a rare species. At least 40 known populations are verified for 13 counties in Arkansas and Oklahoma. Reports of additional county occurrences in Arkansas (Howard and Scott Counties) but not on specimens seen from them, is consistent with the known range (Fig. 2).

Reference to this species as an element of the flora of the Southeastern United States comes from its presence in Arkansas, a politically delimited area generally recognized by botanists as a portion of the

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**Fig. 2.** County distribution of Stachys iltisii in Oklahoma and Arkansas.
Fig. 3. Stachys iltisii: living plants (population of Nelson 26653, LeFlore County OK) with unidentified pollinator (?) at lower left.
“Southeast.” Although Oklahoma is not a Southeastern state, its eastern portions do indeed harbor many “Southeastern” species.

“Ozark hedge-nettle” may be an appropriate common name. This is a handsome species, often robust and conspicuous (Fig. 3), and fairly easy to spot from a moving vehicle. Due to their tendency toward a somewhat compact inflorescence, especially in the sun, the plants do resemble *Teucrium canadense*...but then, various *Stachys* species are commonly confused with “Canada germander,” frequently causing field-trip turn-arounds.

**Etymology.**—Iltis’ unofficial differentiation of this plant as a new taxon deserves recognition. Its occurrence in Oklahoma as well as Arkansas, however, makes the choice of the epithet “*arkansana*” (*Stachys* as a noun requires a feminine ending) unwarranted. As a way of commemorating Hugh Iltis’ interest in the vegetation of the Interior Highlands, and in the genus *Stachys*, and as well acknowledging his tremendous contributions to botany, this taxon is thus named in his honor.

Except that *Stachys iltisii* and *S. eplingii* are (were?) never really common, and that there is a relatively low number of historic collections of each, it is somewhat remarkable that Epling (1934) did not consider formally recognizing them in 1934. On the other hand, *Stachys* in the Southeastern United States has commonly been considered a troublesome genus. Its current taxonomy is fairly stable, although several of the characters (e.g., stem pubescence, petiole length, and calyx lobe dimensions) useful in separating taxa are variously continuous. The considerable variation in some species groups suggests future usefulness to be attained from cytological and breeding system studies.

Nevertheless, practical taxonomy demands results. To this end, two keys are provided for distinguishing *Stachys iltisii* from the other Southeastern species. The first uses relative petiole length as a primary distinction, the second using shape of the calyx lobes. The different structuring of these keys is provided to emphasize different characters; with a particular plant or specimen in hand, the user may find that one or the other key provides the easier route to identification.

**SOUTHEASTERN STACHYS: KEY #1**

1. Annual; corolla scarcely exserted from calyx; LA-MS-AL-FL-SC  
   - *S. agraria*

1. Perennial; corolla prominently exserted from calyx, widespread.

   2. Petioles obvious (at least some of those in the middle portion of the stem at least 1/5 as long as the leaf blade).

   3. Calyx tubes glandular.

   4. Leaf blade margins dentate or nearly so; stem a glabrously pubescent with long (to 3 mm), spreading hairs  
   - *S. clingmanii*

   4. Leaf blade margins mostly crenate; stem angles glabrate or pubescent with mostly short, retrorse hairs.

   5. Leaf blades <3 cm wide; plants pinnately compound, in dense patches, scarcely to .75 m tall, with white, rounded tubers terminating rhizomes  
   - *S. floridana*

   5. Leaf blades commonly >3 cm wide; plants not weedy, never in dense patches, commonly 1 m tall of greater; rounded tubers absent.

   6. Leaf blades ovate, the bases cordate; margins crenulate; IN-OH-WV-KY-VA  
   - *S. cordata*

   6. Leaf blades elliptic-oblong, the bases rounded to slightly cordate; margins crenate to serrate; KY-TN-GA-AL-SC  
   - *S. nuttallii*

3. Calyx not glandular, or very slightly so.

   7. Calyx glabrous to sparsely pubescent; petioles well-developed, especially in shade forms  
   - *S. tenuifolia*

   7. Calyx variously hairy, but at least hispidulous, frequently strongly hispid; petioles short or long.

   8. Petioles usually well developed; stem angles abundantly pubescent with spreading hairs; blade margins commonly dentate  
   - *S. clingmanii*

   8. Petioles short to nearly absent; stem angles commonly pubescent, with retrorse hairs; blade margins serrate, but not dentate  
   - *S. hispida*

2. Petioles short (the midstem leaves with petioles less than 15 mm) or absent.

9. Leaves linear-lanceolate to narrowly lanceolate, usually widest at or near the base; leaf margins entire to crenulate, rarely serrulate, and then mostly toward the apex.
Nelson, A new species of Stachys from the Interior Highlands of the US

10. Leaf blades abundantly pubescent below with appressed hairs, thus closely tomentose, the lower surface feltly or velvety; corolla white, pink, or purplish.

11. Stems angles and sides abundantly soft pubescent, with mostly soft, spreading hairs, corolla white; rare adventive (SC) ____________________________ S. pilosa

11. Stem angles and sides abundantly pubescent, the angles equipped with at least some stiff, retrorse hairs, corolla purple; rare adventive (AL) ____________________________ S. palustris

10. Leaf blades variously pubescent or glabrate, but never feltly or velvety; corolla pink.

12. Leaf blades narrow, 3–6 mm wide; plants generally glabrous to moderately pubescent; blade margins entire to obscurely crenulate ____________________________ S. hyssopifolia

12. Leaf blades broader, 5–8 mm wide; plants frequently hispidulous or at least moderately pubescent, or abundantly hairy; blade margins crenulate to serrulate ____________________________ S. aspera

9. Leaves ovate to elliptic, widest near the center or toward the apex; oblong; leaf margins crenate to sharply serrate for nearly the entire length.

13. Stem sides commonly pubescent above.

14. Calyx lobes lanceolate; flower 6 per vertical; leaf margins crenate-crenulate.

15. Leaves generally subsessile, the petioles thick, not longer than 6mm; blades densely pubescent, frequently soft-pilose to scaberulous; leaf margins serrate; introduction from farther north and west (VA) ____________________________ S. arenicola

15. Leaves generally petaled up to 15mm long, although commonly shorter, and relatively slender; blades pubescent on both surfaces, but never to the point of being pilose or scaberulous; leaf margins crenate-serrulate; KY-TN-GA-AL-SC ____________________________ S. nuttallii

14. Calyx lobes deltoid; flowers 8 or more per verticil; leaf margins crenate-crenulate; native s with bipolar distribution, OK-AR, WV-MD.

16. Lower leaf surface densely sessile- and stipitate-glandular, blades ovate, widest in lower third of leaf; adjacent upper verticils separated in fruit; WV-VA-MD-DC (NC) ____________________________ S. eplingii

16. Lower leaf surface glandular, but not densely so; blades elliptic-ovate, widest at middle; adjacent upper verticils commonly crowded in fruit; OK-AR ____________________________ S. iltisii

13. Stem sides glabrous, the angles pubescent.

17. Fruiting calyx lobes lanceolate, hispidulous to hispid, about half as long as the calyx tube;__________________________ S. hispida

17. Fruiting calyx lobes deltoid or triangular, shorter than half the length of the calyx tube.

18. Leaf margins sharply serrate, nearly always with sharp teeth; bracts gradually reduced upward from lowest flowering node, leaf blades elliptic, rounded to truncate at base; Blue Ridge (VA) ____________________________ S. subcordata

18. Leaf margins serrate to crenate; teeth often more rounded; bracts abruptly reduced upward from lowest flowering node; leaf blades oblong-elliptic; Blue Ridge to upper piedmont, VA-NC-TN-SC-GA ____________________________ S. latidens

SOUTHEASTERN STACHYS: KEY #2

1. Fruiting calyx lobes deltoid to broadly triangular, mostly < 1/2 tube length.

2. Stem sides pubescent; foliage glandular, often with musky scent when crushed.

3. Petioles short to absent, blades mostly rounded to truncate-cordate.

4. Lower leaf surface densely glandular, with atomiferous/short-stipitate golden glands; blades prevailingly ovate, broadest toward base; WV-VA-MD (NC) ____________________________ S. eplingii

4. Lower surface glandular, but not densely; blades prevailing elliptic, somewhat lyrate toward base, broadest toward midblade; AR-OK ____________________________ S. iltisii

3. Petioles well developed, blades commonly cordate at the base.

5. Top of blooming stem frequently flexuous, somewhat lax; blades ovate-rounded, IN-OH-WV-KY-VA-NC ____________________________ S. cordata

5. Top of blooming stem stiffish, not lax; blades oblong-elliptic; KY-TN-GA-AL-SC ____________________________ S. nuttallii

3. Stem sides glabrous; crushed fresh foliage with grass-like scent, not musky.

6. Leaves sessile to subsessile; bracts rapidly reduced upward (Appalachians, GA-WV) ____________________________ S. latidens

6. Leaves subsessile or petioles to 10mm long; bracts gradually reduced upward (Blue Ridge, VA) ____________________________ S. subcordata

1. Fruiting calyx lobes lanceolate, narrowly triangular, or nearly subulate, half as long as tube (or > 1/2 as long).

7. Leaf blades linear to lanceolate.

8. Corolla white; stem sides with at least moderate pubescence on the highest sterile internode, moderately to densely pubescent on higher internodes; lower leaf surface abundantly pubescent to velvety-pilose (SC) ____________________________ S. pilosa
8. Corolla pink; stem sides without pubescence, except for internodes within the inflorescence, which
may bear light villous or glandular hairs; lower leaf surface glabrous or pubescent, but not velvety.
9. Leaf blade margins entire to crenate; plants generally glabrous __________________________ S. hyssopifolia
9. Leaf blade margins serrate with at least a few teeth; plants glabrous or pubescent.
10. Stems strict or sparingly branched; leaves sessile or barely petioled, the blades crenate to serrate
with shallow teeth ________________________________________________________________ S. aspera
10. Stems frequently branched from the upper nodes; leaves obviously petioled, the blades
sharply toothed _________________________________________________________________ S. tenuifolia
7. Leaf blades wider, rounded, oblong to elliptic.
11. Petioles poorly developed, essentially absent.
12. Upper stem sides glabrous ______________________________________________________ S. hispida
12. Upper stem sides variously pubescent, glandular and/or eglandular.
13. Corollas purple; rare adventive (AL) _____________________________________________ S. palustris
13. Corollas pink; native species.
14. Blades copiously pubescent, scabrous to merely felty; rare in SEUS, adventive in VA from
north and west ________________________________________________________________ S. arenicola
14. Blades pubescent, but never scabrous or felty; higher elevations, KY-TN-GA-AL-SC
________________________________________________________________________ S. nuttallii
11. Petioles obvious, frequently 1/5 the length of the blade.
15. Leaf blades dentate or sharply dentate; stem angles abundantly pubescent with spreading or
somewhat retrorse, long (to 3 mm) hairs ____________________________________________ S. clingmanii
15. Leaf margins crenate to serrulate, but never dentate; stem angles glabrous or pubescent (if the
latter, then with scattered, stiffish, retrorse hairs).
16. Annual; corolla scarcely exserted from calyx; LA-MS-AL-FL-SC _________________________ S. agraria
16. Perennial; corolla prominently exserted from calyx; widespread.
17. Plants commonly glandular on stems, leaves, and within inflorescence.
18. Plant producing thick, segmented, tuber-like rhizomes; blades oblanceolate; [weedy, mostly of coastal plain ___________________________________________________________________________ S. floridana
18. Plant rhizomatous, but not producing thick, tuberous thickening of rhizomes; blades
elliptic, cordate; not weedy [higher elevations, mostly mountains, KY-TN-GA-AL-SC
_____________________________________________________________________________ S. nuttallii
17. Plants not glandular on stems, leaves, and within inflorescence.
19. Calyx usually abundantly pubescent with stiff, eglandular hairs; fruiting calyx lobes
straight, terminally apiculate _____________________________________________________ S. hispida
19. Calyx usually glabrous to sparingly pubescent; fruiting calyx lobes frequently curved
or curling/retrorse, not at all or only weakly apiculate __________________________________ S. tenuifolia

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