DISTRIBUTION AND ESTABLISHMENT OF *LYCORIS RADIATA* VAR. *RADIATA* (AMARYLLIDACEAE) IN THE ARKANSAS (U.S.A.) FLORA

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ABSTRACT

Naturalized *Lycoris radiata* var. *radiata* was not well-studied in Arkansas prior to 2024, and as a result, the species was known outside of cultivation only from Clark, Ouachita, and Drew counties, and equivocal as to how this sterile, triploid taxon establishes wild populations in the state. Field work in southern and western Arkansas during 2024 and 2025, focusing on the occurrence and establishment ecology of *L. radiata* var. *radiata*, yielded 16 additional county records of naturalized plants and a putative mechanism facilitating establishment in the flora. While many of the escaped/naturalized occurrences of *L. radiata* var. *radiata* are tied directly to source pools of cultivated plants, some instances are more remote, indicating that one or more propagule dispersal mechanisms exist. We propose a mechanism of naturalization from asexual production of bulblets and their migration toward the surface of substrate—exposed bulblets at the soil surface then provide opportunity for separation from the parent colony and subsequent dispersal via multiple vectors, primarily water movement, to remote locations for establishment.

RESUMEN

La especie naturalizada *Lycoris radiata* var. *radiata* no había sido objeto de un estudio exhaustivo en Arkansas antes de 2024 y, en consecuencia, fuera de los cultivos solo se conocía su presencia en los condados de Clark, Ouachita y Drew, y no estaba claro cómo este taxón estéril y triploide establecía poblaciones silvestres en el estado. El trabajo de campo realizado en el sur y el oeste de Arkansas durante 2024 y 2025, centrado en la presencia y la ecología de establecimiento de *L. radiata* var. *radiata*, proporcionó 16 registros adicionales de plantas naturalizadas en distintos condados y un mecanismo putativo que facilita su establecimiento en la flora. Si bien muchos de los casos de escape o naturalización de *L. radiata* var. *radiata* están directamente vinculados a fuentes de plantas cultivadas, algunos casos son más remotos, lo que indica que existen uno o más mecanismos de dispersión de propágulos. Proponemos un mecanismo de naturalización a partir de la producción asexual de bulbos y su migración hacia la superficie del sustrato; los bulbos expuestos en la superficie del suelo

J. Bot. Res. Inst. Texas 20(2): 173–187. 2026
https://doi.org/10.17348/jbrit.v20.i2.1476
Published online: 17 June 2026

proporcionan entonces la oportunidad de separarse de la colonia madre y de dispersarse posteriormente a través de múltiples vectores, principalmente el movimiento del agua, hacia lugares remotos para su establecimiento.

Key Words: Amaryllidaceae, surprise lily, red spider lily, Arkansas, establishment, Lycoris

INTRODUCTION

Lycoris radiata in a broad sense comprises a species complex, with fertile diploid, sterile triploid, and rare tertraploid taxa, along with chromosomal variants within the diploid and triploid forms, although the taxa within the complex morphologically are similar (Hsu et al. 1994; Ji & Meerow 2000; Liu et al. 2019). Hybridization and polyploidy are key elements of species diversity and genome variation in *Lycoris*, and in some instances, speciation in the genus may involve multiple hybridization and polyploidization events, where allopolyploidy has had a dominant role (Shu et al. 2025).

Lycoris radiata (L'Héritier) Herbert var. *radiata* (red surprise lily, red spider lily, red hurricane lily; Fig. 1) is a sterile, triploid, bulbaceous perennial native to China, Japan, Korea, and Nepal (Hsu et al. 1994; Ji & Meerow 2000). *Lycoris radiata* var. *radiata*, which probably is of autopolyploid origin, is widespread in both China and portions of Japan and has the widest distribution of any species of *Lycoris* (Liu et al. 2016; Liu et al. 2019; Shu et al. 2025). Its broad distribution is largely because of strong vegetative reproduction-propagation from the rapid formation of new lateral bulbs (Hsu et al. 1994; Liu et al. 2019). At least two genetically distinct strains of variety *radiata* exist; however, it is not known whether they represent a common lineage or independent occurrences from different diploid ancestors (Liu et al. 2016).

Lycoris radiata var. *radiata* is cultivated frequently for its large, showy, autumn flowers and robust stress and shade tolerance, and as a result, commonly is encountered both in cultivation and persistent or naturalized in urban and semi-urban areas in the southern U.S.A., including Arkansas, and elsewhere (Kurita 1986; Hsu et al. 1994; Ma et al. 2000; Gentry et al. 2013; Song et al. 2014; Kartesz 2015; Liu et al. 2016; Serviss & Peck 2017; Spaulding et al. 2021; Jiang et al. 2024; Keener et al. 2025; Weakley & Southeastern Flora Team 2025; Wunderlin et al. 2025). Although sterile, variety *radiata* propagates asexually via vigorous production of bulblets that undoubtedly function as propagules for spread and naturalization (Liu 2016; Serviss & Peck 2017; Spaulding et al. 2021; Busbee et al. 2022). In the U.S.A., the flowers of variety *radiata* are visited by swallowtail and sulfur butterflies (Serviss & Peck 2017). The bulbs and other portions of the plant are toxic owed to the presence of numerous alkaloids, the most abundant being galanthamine, haemanthidine, homolycorine and lycorine (Lee et al. 2003; Cahlíková et al. 2020). The fertile, diploid form of the species, *L. radiata* (L'Héritier) Herbert var. *pumila* C.H. Grey, infrequently is cultivated in the U.S.A. and likely not truly naturalized in the flora.

Lycoris radiata var. *radiata* was not well-studied in the Arkansas flora prior to 2024, and as a result, was documented outside of cultivation from only three Arkansas counties: Clark, Drew, and Ouachita (Gentry et al. 2013; Serviss & Peck 2017). Serviss and Peck (2017) briefly discuss plausible scenarios for its establishment in the state; however, little information exists on its biology and ecology in the southeastern U.S.A. In China, native habitat for *L. radiata* is temperate, broad-leaf forests with moist soils, rocky places along stream banks, and shady and moist sites on slopes (Ji & Meerow 2000; Liu et al. 2016; Cai et al. 2019). In both China and Japan, it also frequently occurs persistently and in a wild state within urban areas, particularly in disturbed sites such as residential zones, the edges of rice paddies, plantation margins, graveyards, and other degraded habitats with moist soils (Hsu et al. 1994; Hayashi et al. 2005). In Arkansas, and elsewhere in the southern U.S.A., persistent and naturalized plants of *L. radiata* var. *radiata* are encountered in similar habitats—disturbed sites, waste places, fields, lawns, graveyards, embankments, slopes, ravines, stream sides, and alluvial woods in moist soils, often in or near urban environments where water (or possibly other vectors) has transported and deposited bulbs and/or whole plants. Truly naturalized plants seemingly most often are encountered along alluvial streams in urban environments, where water movement likely transports and deposits bulbs from source plants into those areas where they subsequently establish. Spread and deposition of bulbs and plants by human activities, such as moving of soil and horticultural discards, also provide propagules for

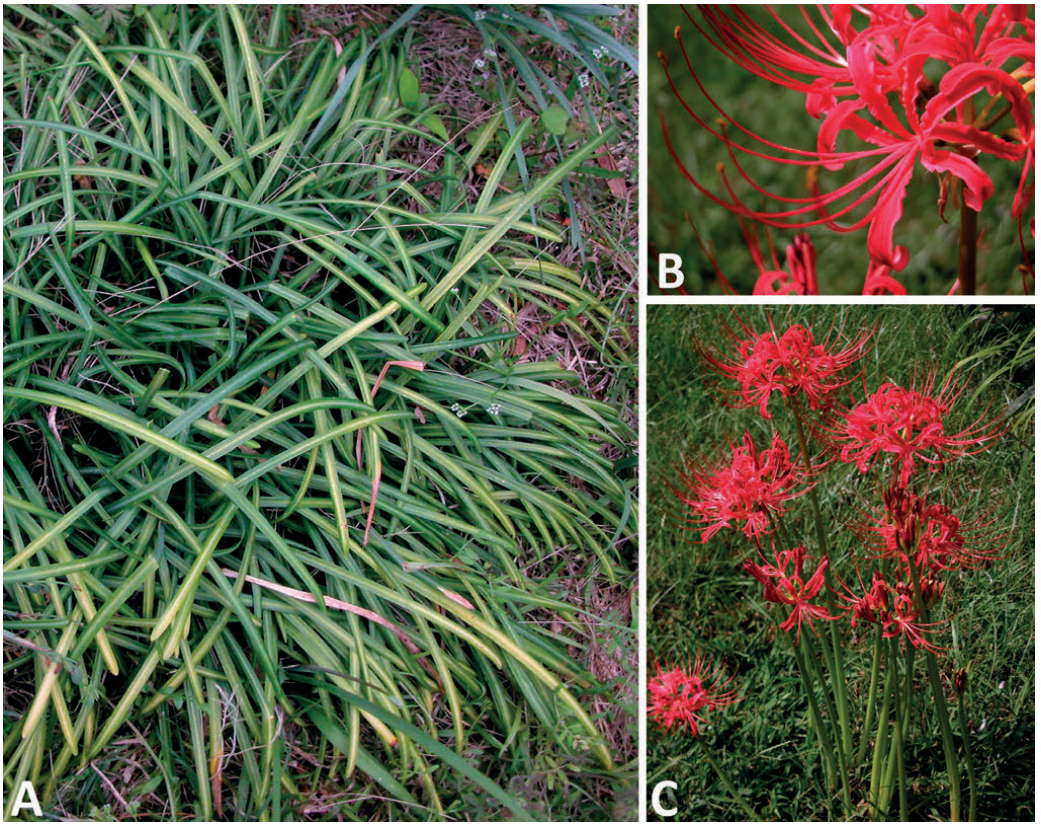

Fig. 1. A–C. Plant and habit of *Lycoris radiata* var. *radiata*; from Arkansas plants. A. Plants and leaves. The narrow pale green stripe along the central adaxial leaf surface is characteristic. B.–C. Flowers, inflorescences, and scapes; notice that the foliage leaves are absent during flowering.

establishment of variety *radiata* in the flora. In fact, a combination of anthropogenic and natural processes undoubtedly facilitate dispersal of bulblets, including mechanisms proposed by Serviss et al. (2016a, 2016b, 2019, 2024) and Serviss and Kratz (2024), that have contributed to establishment of variety *radiata* and many other exotic bulbaceous and cormose taxa in the state. Field and herbarium studies conducted in 2024 and 2025, focusing on *L. radiata* var. *radiata*, documented its naturalized occurrence from several additional counties and provided a putative mechanism, based on the combination of two vegetative routes of propagule production, that likely facilitate dispersal and establishment in the state's flora.

Distribution and establishment of *Lycoris radiata* var. *radiata* in the Arkansas flora

New records of *Lycoris radiata* var. *radiata* are reported herein from 16 Arkansas counties: Calhoun, Cleveland, Columbia, Crawford, Dallas, Garland, Grant, Hempstead, Hot Spring, Howard, Miller, Nevada, Pike, Pulaski, Saline, and Sebastian (Fig. 11). Most records consist of clearly escaped/naturalized plants, although some collections likely were from colonies that had persisted from prior cultivation practices. In Arkansas, naturalized occurrences of variety *radiata* typically occur in the vicinity of cultivated or persistent plants of the species (Figs. 7–9); however, this is not always the case, as many of our records apparently were owed to dispersal of propagules, presumably bulbs or whole plants, to more remote areas of establishment. Such areas typically include low sites, especially along stream banks and slopes, where water movement, perhaps coupled with associated soil erosion and/or gravity, had dispersed and subsequently deposited propagules (Figs. 2–6).

Fig. 2. A–D. Naturalized plants of *Lycoris radiata* var. *radiata* in Clark Co., Arkansas. A. Isolated colony of plants at base of bank of small stream. While just above the streambed, these plants would be near the waterline or possibly inundated during times of heavy flow. Another similar clump is present (not shown) some distance above this one on top of the bank. B. Two small, isolated plants from a much larger population occurring in a low area above the same alluvial stream. Many such small, isolated plants were present at this site. Distribution of bulbs by water and/or possibly by burrowing animals may explain the presence of these plants, which were positioned only small distances from larger clumps. C. Another clump along the same stream many meters distant from the one shown in Fig. 2A. D. Plants from a different location than those shown in Figs. 2A–C that are growing in a rubbish pile on a steep slope of a wooded ravine. Several separate groups of naturalized plants, like that shown in the photograph, were present at this location. The distribution mechanism likely was anthropogenic, as much rubbish, including several large pieces of concrete, had been dumped at the site.

Lycoris radiata var. *radiata* is characterized by vigorous asexual production of lateral or basal bulblets/offsets from axillary buds of the basal plate of larger bulbs (Hsu et al. 1994; Xu et al. 2020). This process allows for clumped groups or colonies of plants to develop over time; with individual colonies/clumps often becoming dense and crowded after several years. Some bulbs, those generally positioned toward the bottom and center of clumps, also bear a short segment of stem tissue emerging from the bulb apex with an additional younger apical bulb positioned one to a few centimeters above the original bulb (Fig. 10C–F). Production of these "secondary" bulbs, along with basal offsets from larger bulbs, can cause bulbs to accumulate vertically within a clump and eventually become partially or completely exposed at the soil surface (Fig. 10A, 10G).

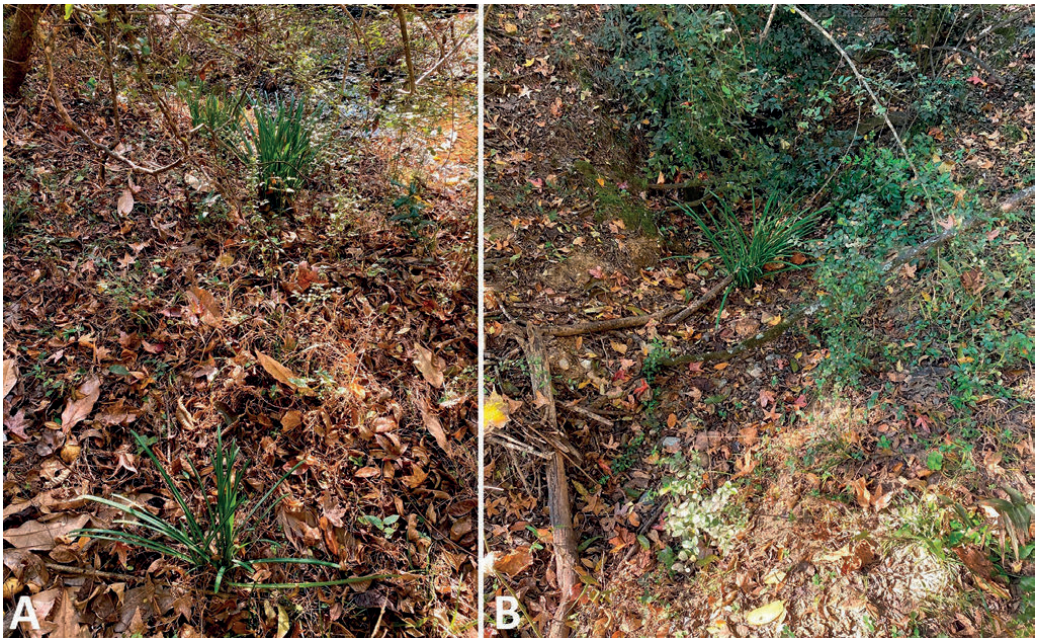

Fig. 3. A–B. Naturalized plants of *Lycoris radiata* var. *radiata* in Arkansas in habitat. A. Three naturalized colonies/clumps of plants (one bottom-center, two upper-middle) on the upper bank of a small, alluvial stream in disturbed urban woods in Clark County. Many similar groups of naturalized variety *radiata* plants are present at this location and occur distributed along the stream bank from near the stream bed to the upper bank and into the surrounding area above. B. Different clump of plants from the same site—this one occurs on the edge of the streambed (left) but also at the base of a wash (upper-right) that occurs along a steep slope above the stream bank. It is likely that these plants originated from a bulb that was transported and deposited by stream water or possibly from water and/or soil movement from plants upslope.

Surface-level bulbs can become loosened over time, possibly through a combination of growth and soil loss at the root system and potentially dislodged from the clump. Water and soil movement, animal activity, and gravity may all play a role in separation of exposed bulbs and plants facilitating dispersal and subsequent establishment (Figs. 2B, 3B, 4, 5).

The production of apically positioned bulbs from older bulbs may occur based on competition for limited space among densely aggregated bulbs and/or be initiated based on bulb age and condition. Older bulbs or those in poor condition because of overcrowding or intense competition for water, nutrients, and space, may be stimulated to produce apically positioned bulbs which eventually reposition an individual plant, thus somewhat reducing competition for growing space and allowing for reinvigoration and an increased likelihood of continued survival. Variety *radiata* also flowers more prolifically if the necks of the bulbs are at or near the soil surface and producing new bulbs higher up may accomplish repositioning of plants to promote flowering. *Lycoris radiata* var. *radiata* produces large bulbs, with considerable recurring investment in biomass for these structures during most of the year (Yang & Nie 2007; Cai et al. 2019). Studies by Cai et al. (2018, 2019) also indicate that even during much of the summer dormancy interval, below ground portions of the plants (bulbs and roots) likely are physiologically active. These characteristics infer a predisposition in variety *radiata* for long-term and considerable investments in bulb growth, resource allocation, and production, including biomass and vigor—the combination of large, physiologically vigorous bulbs, prolific production of lateral bulblets, and apical bulb formation may produce a vertical migration of bulbs towards the soil surface, allowing for potential exposure and separation of propagules from the parent colony and a recurring mechanism for entry and establishment in the flora.

Fig. 4. Naturalized plants of *Lycoris radiata* var. *radiata* in Clark Co., Arkansas. These plants are present along a very steep bank of an intermittent stream and drainage within a highly disturbed, urban greenbelt within the city of Arkadelphia. Many additional plants occur above the ones shown and on top of the bank and into both sides of the surrounding greenbelt. Water movement and/or water-facilitated erosion probably deposited bulbs along the slope where they subsequently established. Notice the very small plant (lower-middle), which almost assuredly is a relatively new arrival. Clumps increase in size moving upward on the bank and into the greenbelt, anecdotally indicating that those closer to the streambed are younger and likely established as offsets dispersed from plants growing at higher elevations.

Fig. 5. Isolated and escaped plant of *Lycoris radiata* var. *radiata* along a highly disturbed urban stream (bottom-center) in Clark Co., Arkansas. This stream recently was dredged and this is the only *Lycoris* plant observed. The origin of the plant is unknown; however, in an adjacent field upslope, many colonies of variety *radiata* are present, probably long persistent from cultivation practices. This stream also connects to the drainage shown in Fig. 3, and thus, long-distance dispersal of one or more bulbs or plants via stream water from that location also is plausible.

Voucher specimens. **U.S.A. Arkansas. Calhoun Co.:** Thornton, immediately S of intersection of N First St. and Farell St., 33.778, –92.490, three small clumps of plants in shallow, disturbed roadside ditch, wet soils, possibly escaped or long-persistent from cultivation, 11 Dec 2025, *Serviss 8875* (HEND). **Clark Co.:** Arkadelphia, SE of intersection of 23rd St. and Caddo St., 34.121, –93.076, many escaped/naturalized plants growing in highly disturbed, urban greenbelt and riparian area, some plants growing on steep stream bank and surrounding urban woods, spread and establishment facilitated by water movement and possibly associated soil erosion, 17 Nov 2025, *Serviss 8872A* (HEND); Arkadelphia, off 12th St. SE of Rose Hill Cemetery, 34.117, –93.060, many scattered clumps/colonies of various sizes in old field along roadside slope, one isolated colony on lower bank of highly disturbed urban stream, 15 Nov 2025, *Serviss 8871A* (HEND); Arkadelphia, Off Main St., S/SE of Rose Hill Cemetery, ca. 34.118, –93.062, numerous escaped/naturalized plants and colonies, both single plants and clumps/colonies of various sizes in low area at base of drainage and scattered along small highly disturbed, semi-wooded alluvial stream and terrace, many plants on and above streambank, 15 Nov 2025, *Serviss 8870A* (HEND); Arkadelphia, just N of intersection N 15th St. and Welch St., 34.130, –93.065, Mill Creek, dozens of escaped plants/colonies established along the banks of Mill Creek in a highly disturbed area, escaped from nearby populations, 23 Jan 2025, *Kratz 01-2025-01* (HEND). **Cleveland Co.:** Rison, ca. 243 ft W of Mockingbird Ln. and Yaney Dr., 33.952, –92.194, scattered in clumps all along ditch side, behind CCYSA ballpark, 17 Nov 2024, *Autrey 2024-11-17-07*

Fig. 6. A–B. Naturalized plants of *Lycoris radiata* var. *radiata* in Arkansas in habitat. A. Single, escaped clump of plants growing on top of steep bank of small stream in highly disturbed urban greenbelt habitat within the city of Texarkana, Miller Co. This was the only specimen of the species observed at the site. B. One of two, escaped clumps of plants on the side of the upper bank of a drainage in highly disturbed habitat in Hope, Hempstead Co. (photo credit: Renn Tumlison, Henderson State University). The site appeared to be the remnant of an old homestead, although no other plants of the species were observed. Both sites are surrounded by residential areas, which likely served as the source pool of propagules for establishment of the plants.

(HEND); Rison, ca. 170 ft N of Pine St. and W Amis St., 33.956, –92.190, escaped, larger clumps scattered in ditch on both sides of Pine St., suspected origin from cultivated plants of the species in adjacent residential area, 17 Nov 2024, *Autrey 2024-11-17-08* (HEND); Rison, ca. 102 ft SE of intersection of Walnut St. and Magnolia St., 33.956, –92.197, likely persistent from prior cultivation, growing in empty lot alongside monkey grass at edge of lot adjacent to tree line, 17 Nov 2024, *Autrey 2024-11-17-09* (HEND). **Columbia Co.:** Magnolia, likely long-persistent from cultivation, growing in abandoned lot and field near remnant of old building adjacent to the Magnolia Memorial Park Cemetery office on N Dudney Rd., 33.273, –93.231, 9 Sep 2025, *Kratz 09-2025-02* (HEND); Magnolia, adjacent to intersection of S Madison St. and Willow St., 33.263, –93.242, likely persistent or possibly escaped colony of plants along roadside near intersection, old overgrown city lot with old homeplace adjacent, 14 Apr 2025, *Ramos 1* (HEND). **Crawford Co.:** Mulberry, near roadside between E Holman St. and E 7th St., ca. 35.503, –94.048, a few plants scattered in unkempt field adjacent to roadside and residence, possibly escaped, 28 Sep 2024, *Fuller 28_09_01_2024* (HEND). **Dallas Co.:** Fordyce, off Overstreet Dr. between Meadowlane Dr. and W 4th St., ca. 33.814, –92.440, several scattered clumps/colonies of plants of various sizes in disturbed urban woods on slight gradient slope above intermittent drainage, escaped or very long-persistent, possibly spreading from once cultivated plants, 11 Dec 2025, *Serviss 8877* (HEND). **Drew Co.:** Monticello, growing spontaneously under willow tree along wet roadside, bulbs perhaps washed in; no evidence of cultivation, 4 Oct 1989, *Sundell 9239* (UAM). **Garland Co.:** Hot Springs, ca. 0.16 mi S of Walkway Dr. and Marion Anderson Rd., 34.453, –93.140, escaped, roadside ditch, growing in gravel from road construction, about 20 yds from planted flowers within rocks on house property, 4 Oct 2024, *Autrey 2024-10-04-05* (HEND). **Grant Co.:** Sheridan, ca. 0.2 mi NE of Grant 167048 and HWY 167, 34.334, –92.391, growing near house (not planted), closest planted specimens 115ft SW, many colonies of plants, growing within monkey grass and weeds, 27 Oct 2024, *Autrey 2024-10-27-06* (HEND); Sheridan, ca. 0.6 mi N of Grant 4620 and HWY 46, 34.374, –92.322, Providence Cemetery, none planted nearby, probably dumped with garbage or horticultural waste, 22 Sep 2024, *Autrey 2024-09-22-01* (HEND); Prattsville, ca. 0.5 mi E of HWY 270 and AR291, 34.315, –92.541, ditch alongside HWY 270, right beside culvert drainage, 22 Sep 2024, *Autrey 2024-09-22-03* (HEND). **Hempstead Co.:** Hope, near intersection of HWY 67 and HWY 278, 33.688, –93.577, two escaped plants at the top of the streambank along a highly disturbed urban drainage, possibly bordering an old homestead, although no other plants of the species were observed, 26 Nov 2025, Serviss 8867 (HEND); Hope, 125 ft S of intersection of HWY 278 and N Hazel St., 33.687, –93.597, possible old home site, clumps of flowers spanning over entire lot, one specimen clearly isolated (apparently not planted), 23 Nov 2024, *Autrey 2024-11-23-10* (HEND). **Hot Spring Co.:** Malvern, 50 ft off Mt. Zion Rd. and Ridge Rd., 34.328, –92.820, disturbed open site, adjacent to old residence, several escaped plants, 5 Mar 2024, *Kratz*

Fig. 7. Naturalized plants of *Lycoris radiata* var. *radiata* in Grant Co., Arkansas. Several plants are present growing in moist soil of a roadside ditch that occurs adjacent to a large pasture (right, not shown). The origin of the plants is unknown; however, they may have been introduced to or redistributed at the site via soil fill during road construction. Persistence from prior cultivation practices is not likely as the population occurs within and along a somewhat steep roadside ditch.

01-2024 (HEND). **Howard Co.:** Nashville, adjacent to intersection of HWY 27 and HWY 278, numerous clumps/colonies of plants distributed over field with wet, heavy clay soil, possibly very long-persistent from prior cultivation, increasing via bulblets, some plants possibly escaped, no direct evidence of prior cultivation, 26 Nov 2025, *Serviss 8868* (HEND). **Miller Co.:** Texarkana, 486 ft SE of intersection of Arnold Dr. and Embassy Ln., 33.440, –94.026, lone escaped colony located along creek/drainage in disturbed urban drainage and greenbelt, top of bank about 10ft above the water level, adjacent to residential area but with no cultivated plants of the species evident, 23 Nov 2024, *Autrey 2024-11-23-10* (HEND). **Nevada Co.:** Prescott, NW of intersection of Monson St. and HWY 67, 33.810, –93.376, many dozens of clumps/colonies of various sizes, including some that were very small, distributed over large, open area, a portion of which may have been an old homesite, some clumps separated from the main population by tens of meters, plants probably a mix of long-persistent and escaped colonies, 11 Dec 2025, *Serviss 8873* (HEND). **Ouachita Co.:** Beside O.C. Road 24 at railroad crossing south of Reader. T11S R19W S30, several clumps in chinaberry thicket in edge of woods, 8 Oct 2000, *Thomas 167947* (ANHC). **Pike Co.:** on HWY 19 W of Delight, 34.029, –93.498, two small groups of plants on highly disturbed roadside, adjacent to small drainage, some soil disturbance at site, possible old homesite but no apparent evidence of prior cultivation, 26 Nov 2025, *Serviss 8869* (HEND). **Pulaski Co.:** Little Rock, Allsopp Park area, one escaped colony growing in disturbed soil along drainage, site surrounded by residential areas, 24 Apr 2025, *Ramos 2* (HEND). **Saline Co.:** Traskwood, off HWY 67, near intersection of HWY 67 and Trammel Ln., 34.494, –92.703, many long-persistent colonies consisting of

Fig. 8. Persistent and escaped plants of *Lycoris radiata* var. *radiata* in Sebastian Co., Arkansas. Shown is a portion of a larger population of plants distributed over a relatively large area in a cemetery. While almost assuredly the original plants were cultivated, the current distribution of many scattered plants and clumps of different sizes, to include numerous small, isolated plants (not shown) that are many meters from the main group, imply spread and establishment after initial cultivation. Clumps are expanding via bulblets but likely soil redistribution has dispersed plants (bulbs) into new areas at the site, where they have established.

100s of plants growing on slight slope in mowed pasture, possibly with some redistribution via soil movement, plants increasing via bulblets, 29 Sep 2025, Kratz *09-2025-10* (HEND); Ouachita Mountains, Central Hills, Ridges, and Valleys Ecoregion, USGS Goosepond Mountain 7.5' Quad, Hot Springs Village, SE of Coronado Lake, NE of Balearic Rd., 100 yds SE of the Minorca Rd. and Balearic Rd. intersection, then 35 yards NE into the woods, 34.647, –92.948, 50+ plants in several dense, well-established colonies, mixed hardwood and pine forest, 4 Oct 2014, *Keesling 14-0049* (ANHC). **Sebastian Co.:** on Browntown Rd., ca. 2 mi N of Huntington, 35.094, –94.269, many seemingly escaped plants scattered over an area in Huntington Cemetery, with some clumps isolated from the main population by several feet, probably establishing from once cultivated plants and subsequent spread from anthropogenic activities, 5 Sep 2025, *Fuller 05_09_01_2025* (HEND).

Two species of *Lycoris* currently are known from the Arkansas flora—*L. radiata* var. *radiata* and *L. squamigera* Maxim. [resurrection lily (Serviss & Peck 2017; Fig. 12)]. *Lycoris squamigera* is infrequent outside of cultivation and documented from Garland and Pulaski counties (Serviss & Peck 2017), although it likely is present in additional counties. Although the two taxa are relatively easy to distinguish, especially when in flower, the following key can be used to distinguish them.

1. Perianth segments red; leaves less than 1 cm wide; plants occasionally flowering late August but more commonly in September and October _____ **Lycoris radiata var. radiata**
1. Perianth segments pale pink to lavender–pink, the tips of the segments often tinged with lavender or purple coloration; leaves 1.5 cm wide or wider; plants generally flowering in July and August or occasionally in September _____ **Lycoris squamigera**

Fig. 9. Naturalized plants of *Lycoris radiata* var. *radiata* in Dallas Co., Arkansas. Many clumps/colonies of plants are present along a shallow slope above an intermittent stream in urban, disturbed woods within the city of Fordyce. The location may have been an old homestead at one time as it borders a residential area; however, most plants appeared to be escaped (or at least very long persistent), and no evidence of prior cultivation was observed except for a short line of plants positioned near one edge of the location.

Fig. 10. A–G. Bulb production in *Lycoris radiata* var. *radiata*; from Arkansas plants. **A.** Excavated clump of plants showing vertical (stacked) arrangement of bulbs. **B.** Mother bulb (right) and associated bulblet (left)—vigorous production of bulblets from axillary buds of the basal plate of larger bulbs is typical for *L. radiata* var. *radiata* and its principal method of propagule production. **C.–F.** New bulbs arising from the neck area of older bulbs—although only observed in some clumps and likely precipitated based on overcrowding of plants, production of these "secondary," apically positioned bulbs seemingly allows the plants a pathway of vertical migration toward the soil surface, which likely facilitates access to light and promotes flowering, but also places bulbs at the soil surface where they potentially can be dislodged and subsequently dispersed to new areas promoting establishment. Notice the progenitor bulbs shown in Fig. 10F are relatively young, whereas those in Fig. 10D are older and in a state of decline. Three sets of these paired apical and basal bulbs can be seen in the group of plants in Fig. 10E; there were several others in this clump. **G.** Clump of plants at the top of a steep slope with numerous partially exposed bulbs, some of which were very loosely held in the soil at the time of inspection. Many naturalized plants were present downslope. Notice that a portion of the body of one of the centrally located bulbs is exposed, where much of the tunic is visible.

ACKNOWLEDGMENTS

We are grateful to one anonymous reviewer for his/her helpful editorial suggestions regarding this paper. We thank Neri Ramos, Tiffany Taylor, and Renn Tumlison for their assistance in locating and collecting specimens of variety *radiata* in Columbia, Garland, Hempstead, Howard, Pike, and Pulaski counties, and Renn Tumlison for use of his photograph of variety *radiata* from Hempstead County. A very special thanks to Craig Meyer and Barney Lipscomb for their outstanding editorial assistance with this and other papers.

REFERENCES

Bailey, L.H. & E.Z. Bailey. 1976. Hortus third: A concise dictionary of plants cultivated in the United States and Canada. Vol. 2. Macmillan, New York, U.S.A.

Busbee, L., F. Andrews, & J. Criss. 2022. Spider lily, *Lycoris radiata*. Santa Rosa County Cooperative Extension publication, UF/IFAS Extension, University of Florida, Gainesville, U.S.A.

Cai, J., J. Fan, X. Wei, & L. Zhang. 2019. A three-dimensional analysis of summer dormancy in the red spider lily (*Lycoris radiata*). HortSci. 54(9):1459–1464.

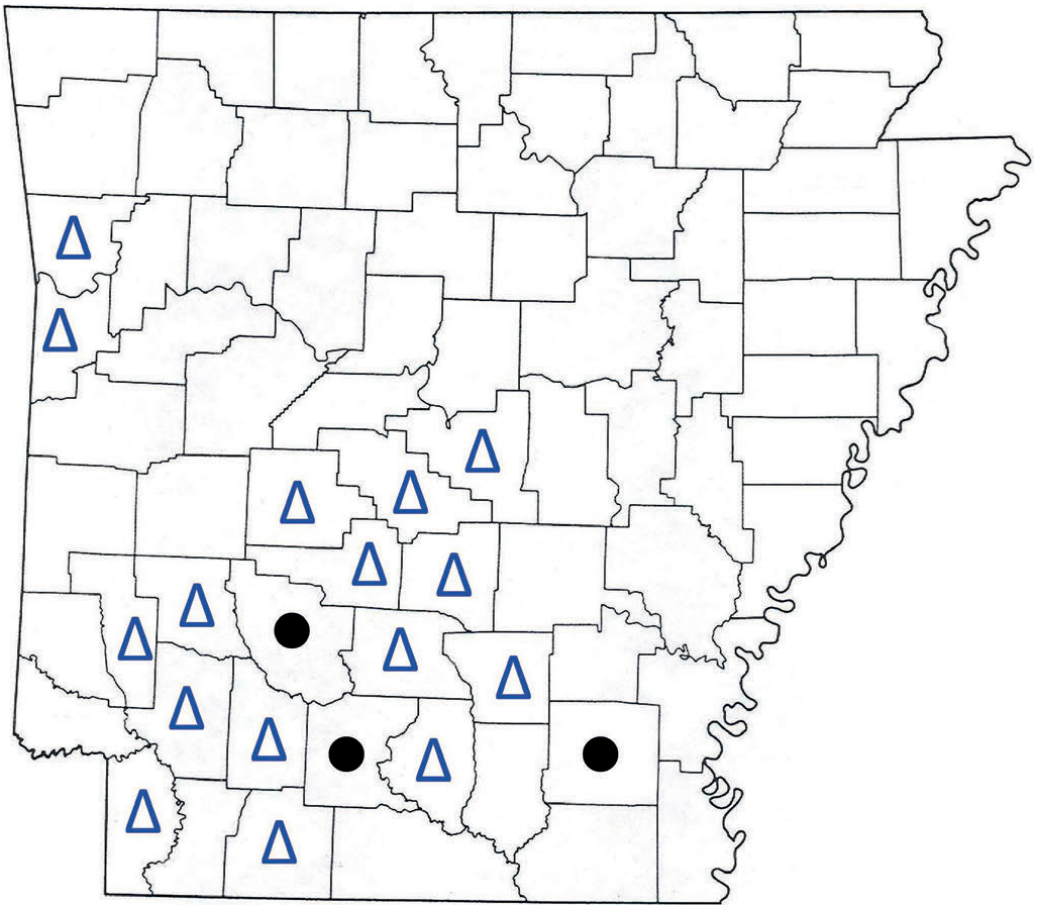

Fig. 11. County distribution of *Lycoris radiata* var. *radiata* in Arkansas. Counties designated with black circles (Clark, Drew, and Ouachita) represent the known distribution prior to 2024. Counties with blue triangles represent new records of this species for 2024–2025. *Lycoris radiata* var. *radiata*, although currently known from 19 counties, likely occurs outside of cultivation in all counties in the southern one-half of the state.

Cai, J.H., J.F. Li, X.Y. Wei, & L. Zhang. 2018. Dynamic change in biomass, root vigor and replacement rate during the green leaf period of *Lycoris radiata*. J. Nanjing For. Univ. (Nat. Sci. Ed.) 42(1):1459–1464.

Cahlíková, L., K. Breiterová, & L. Opletal. 2020. Chemistry and biological activity of alkaloids from the genus *Lycoris* (Amaryllidaceae). Molecules 25:1–20.

Gentry, J.L., G.P. Johnson, B.T. Baker, C.T. Witsell, & J.D. Ogle. 2013. Atlas of the vascular plants of Arkansas. Vascular Flora Project, Univ. of Arkansas, Fayetteville, U.S.A.

Hayashi, A., T. Saito, Y. Mukai, S. Kurita, & T. Hori. 2005. Cytological analysis of the bulblet initiation and development in *Lycoris* species. Genes Genet. Syst. 80:199–212.

Hsu, P-S., S. Kurita, Z-Z. Yu, & J-Z. Lim. 1994. Synopsis of the genus *Lycoris* (Amaryllidaceae). Sida 16:301–331.

Ji, Z. & A.W. Meerow. 2000. Amaryllidaceae. In Z.Y. Wu & P.H. Raven, eds. Flora of China. Vol. 24 (Flagellariaceae through Marantaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis, U.S.A. Pp. 264–273.

Jiang, X., X. Wei, H. Cheng, X. You, & J. Cai. 2024. Metabolomic analysis of *Lycoris radiata* across developmental and dormancy stages. Horticulturae 10(6), 636:1–12.

Kartesz, J.T. 2015. Taxonomic data center. The biota of North America program (BONAP). Chapel Hill, North Carolina, U.S.A. http://www.bonap.org/index.html. Accessed November 2025.

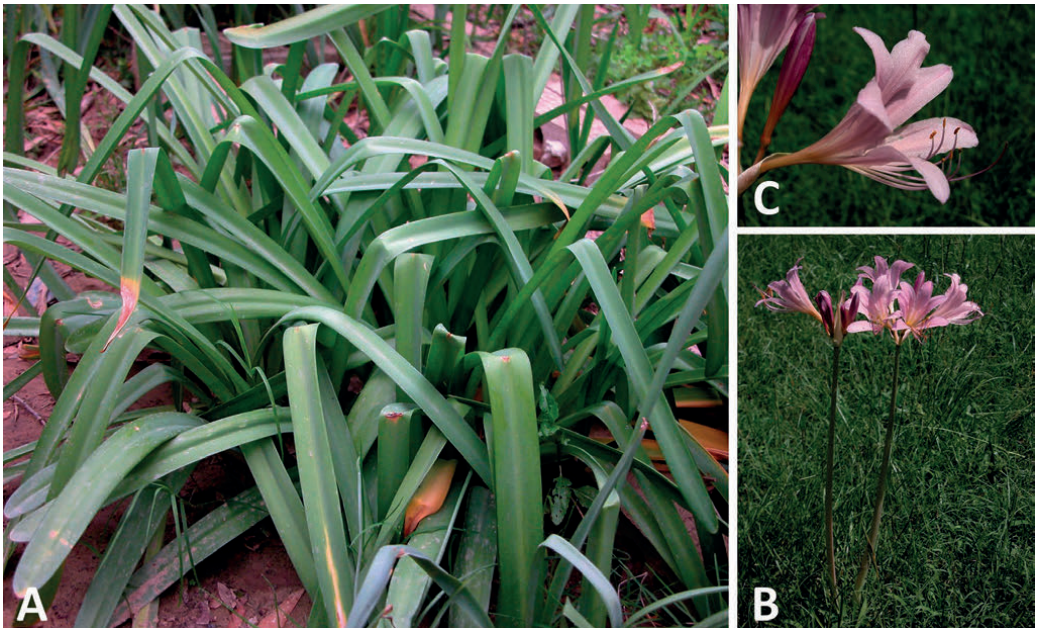

Fig. 12. A–C. Plant and habit of *Lycoris squamigera*, for comparison with *L. radiata* var. *radiata*; from Arkansas plants. A. Plants and leaves—notice the leaves are larger than those of variety *radiata*. B.–C. Flowers, inflorescences, and scapes—notice that like variety *radiata*, the foliage leaves are absent during flowering; however, the flowers are larger with wider tepals and and pink to lavender-pink.

Keener, B.R., A.R. Diamond, L.J. Davenport, P.G. Davison, S.L. Ginzbarg, C.J. Hansen, C.S. Major, D.D. Spaulding, J.K. Triplett, & M. Woods. 2025. Alabama Plant Atlas. [S.M. Landry & K.N. Campbell (original application development), Florida Center for Community Design and Research. University of South Florida]. University of West Alabama, Livingston, U.S.A. Available at http://floraofalabama.org/. Accessed November 2025.

Kurita, S. 1988. Variation and evolution in the karyotype of *Lycoris*, Amaryllidaceae VII. Modes of karyotype alteration within species and probable trend of karyotype evolution in the genus. Cytologia 53:323–325.

Kurita, S. 1986. Variation and evolution in the karyotype of *Lycoris*, Amaryllidaceae I. General karyomorphological characteristics of the genus. Cytologia 51:803–815.

Lee, J-S., B-S. Ihm, & H-S. Kim. 2003. Ecological characteristics of *Lycoris radiata* with habitat types. Korean J. Ecol. 26:247–250.

Liu, K., W. Meng, L. Zheng, L. Wang, & S. Zhou. 2019. Cytogeography and chromosomal variation of the endemic East Asian herb *Lycoris radiata*. Ecol. Evol. 9:6849–6859.

Liu, Y.X., Y.H. Zheng, T. Xia, & J. Zhou. 2016. Karyotype studies on *Lycoris radiata* populations from China. Genet. Molec. Res. 15(1):15017357.

Ma, B., I. Tarumoto, & T. Morikawa. 2000. Cytological studies on selfed plants and interspecific crosses produced in four species of genus *Lycoris* (Amaryllidaceae). Sci. Rep. Coll. Agric. Osaka Pref. Univ. 52:13–18.

Serviss, B.E. & J.R. Kratz. 2024. First record of *Crocosmia* × *crocosmiiflora* (Iridaceae) in the naturalized Arkansas flora. Phytoneuron 2024-56:1–6.

Serviss, B.E. & J.H. Peck. 2017. *Lycoris squamigera* (Amaryllidaceae) new to the Arkansas flora. Phytoneuron 2017-81:1–5.

Serviss, B.E., K.R. Benjamin, & J. Keesling. 2016a. A guide to the naturalized *Narcissus* in Arkansas. Phytoneuron 2016-25:1–27.

Serviss, B.E., M.J. Campbell, & C.A. Fuller. 2024. First records of *Lilium lancifolium* (Liliaceae) from the Oklahoma flora. Phytoneuron 2024-88:1–5.

Serviss, B.E., J.H. Peck, & K.R. Benjamin. 2016b. *Crocus flavus*: A new genus and species of non-native Iridaceae for the Arkansas (U.S.A.) flora. J. Bot. Res. Inst. Texas 10(2):513–516.

Serviss, B.E., T.K. Serviss, J.W. Hardage, & J.H. Peck. 2019. New records in the Hyacinthaceae for the Arkansas flora. Phytoneuron 2019-38:1–10.

Song, H., W.D. Cui, M. Yu, & X.M. Sun. 2014. Study on progress of *Lycoris* herb. J. Harbin Univ. Commer. 30(6):649–653.

Shu, X., R. Lu, P. Heslop-Harrison, T. Schwarzacher, Z. Wang, Y. Qin, N. Wang, & F. Zhang. 2025. Unraveling the evolutionary complexity of *Lycoris*: Insights into chromosomal variation, genome size, and phylogenetic relationships. Pl. Div. 47(6):(in press) doi:10.1016/j.pld.2025.06.010.

Spaulding, D.D., J.T. Kartesz, H.E. Horne, B.J. Finzel, & J.K. England. 2021. Flora of northern Alabama, part 5. Liliaceous families. Phytoneuron 2021-30:1–262.

Weakley, A.S. & Southeastern Flora Team. 2025. Flora of the southeastern United States web app. University of North Carolina Herbarium, North Carolina Botanical Garden, Chapel Hill, U.S.A. Available at http://fsus.ncbg.unc.edu. Accessed November 2025.

Wunderlin, R.P., B.F. Hansen, A.R. Franck, & F.B. Essig. 2025. Atlas of Florida plants. [S.M. Landry & K.N. Campbell (application development), USF Water Institute]. Institute for Systematic Botany, University of South Florida, Tampa, U.S.A. Available at http://florida.plantatlas.usf.edu/. Accessed November 2025.

Xu, J., Q. Li, L. Yang, X. Li, Z. Wang, & Y. Zhang. 2020. Changes in carbohydrate metabolism and endogenous hormone regulation during bulblet initiation and development in *Lycoris radiata*. BMC Pl. Biol. 20–180:1–17.

Yang, L.P. & Q.J. Nie. 2007. Study on biomass reproduction allocation of *Lilium pumilum* in different inhabits. In: Q. Zhang, ed. Collected papers of the 2007 annual meeting of the Chinese ornamental horticulture committee. China Forestry Publishing House, Beijing, China. Pp. 366–369.