

## NEW RECORDS IN THE HYACINTHACEAE FOR THE ARKANSAS FLORA

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### ABSTRACT

*Hyacinthoides X massartiana*, *Hyacinthus orientalis*, and *Muscari armeniacum* are reported here for their first occurrences outside of cultivation in Arkansas. Escaped plants of *H. X massartiana* are documented from Ouachita and Pulaski counties, escaped plants of *H. orientalis* are documented from two locations in Clark County, and escaped plants of *M. armeniacum* are documented from Clark, Faulkner, and Hot Spring counties. The Pulaski County record of *H. X massartiana* possibly was persistent from cultivation. Photographs of all three taxa in habitat and keys to identification of the blue-flowered Hyacinthaceae species present in the Arkansas flora are included, along with notes on the family.

In 2019, records of escaped plants of *Hyacinthoides X massartiana* Geerinck (*H. X variabilis* P. D. Sell; hybrid bluebell) and *Hyacinthus orientalis* L. (hyacinth) were documented from Ouachita and Clark counties, respectively, in Arkansas. An additional record of *H. X massartiana* from Pulaski County is provided, although the specimen record is from 1975. These two taxa previously have not been documented in the state outside of cultivation (Arkansas Vascular Flora Committee 2006; Gentry et al. 2013), and this account provides the first documented occurrences of these species and genera in the Arkansas flora. Also in 2016 and 2019, escaped plants of *Muscari armeniacum* Leicht. ex Baker (garden grape hyacinth) were documented from Clark, Faulkner, and Hot Spring counties, providing the first documented occurrence of this species in Arkansas outside of cultivation.

### *Hyacinthoides X massartiana*

Escaped plants of *Hyacinthoides X massartiana* were documented from a single location in Ouachita County (Figs. 1–3). These plants were present as a small population that consisted of dozens of individuals and small clusters of plants (the clusters probably produced through a combination of bulb offsets and seed production — Fig. 2) scattered over a semi-wooded slope and adjacent area at the base of the slope in disturbed woods. Most of the escaped plants were present at the edge and slightly into the woods at the base of the slope. Both blue and white-flowered forms were present. Establishment of the escaped population appeared to be accomplished via seeds and their associated spread by water and/or gravity from presumably once cultivated plants that were present upslope. The plants of *H. X massartiana* at the top of the slope were present in a semi-wooded portion of an adjacent property—these plants appeared to at least in part be persisting from prior cultivation and likely were the initial source of the escaped population.



Figure 1. *Hyacinthoides X massartiana* in Ouachita County, Arkansas. Both plants shown were escaped in highly disturbed woods at the base of a gradual slope. Plants shown in A and B were separated by several meters and occurred as part of a larger population consisting of dozens of *H. X massartiana* plants.



Figure 2. White-flowered form of *H. X massartiana* just within disturbed woods adjacent to the main population. Notice the well-developed fruits present on these plants (several other plants in the population also had fruits).

A 1975 record of *H. X massartiana* from Pulaski County is present in the LRU collection; however, it is unclear from the specimen data as to whether this plant was escaped or persistent from cultivation practices. It is included here because no mention of cultivation or a residential address is given in the specimen data, and it may represent an additional occurrence of this taxon from the Arkansas flora.

**Voucher specimens. Arkansas. Ouachita Co.:** Several escaped plants on slope and base of slope at edge and within disturbed woods near old homesite, plants with range of phenotypes in inflorescence and floral morphology, off Hwy 24, across 24 from storage buildings, 1/2 mi from Y-Mart at intersection of 4 and 24, Camden, 6 Apr 2019, *Serviss 8680* (HEND). **Pulaski Co.:** Maddox Rd., 3 mi E of Hwy 107, 18 Apr 1975, *M. Pierce 300* (LRU, HEND).

*Hyacinthoides X massartiana* is a naturally occurring, interspecific hybrid between *H. non-scripta* (L.) Chouard ex Rothm. (English bluebell) and *H. hispanica* (Mill.) Rothm. (Spanish bluebell) that is frequent in many areas of Europe, with or without the presence of the parental taxa (Heywood 1980; Stace 2010), even though, apparently, the natural ranges of the two parental taxa only slightly are sympatric (Grundmann et al. 2010). In Britain, *H. X massartiana* is by far the commonest of the three taxa in gardens, where many plants are misidentified as *H. hispanica*. There is circumstantial evidence that hybridization of the parental taxa takes place in Britain, but most wild (escaped or planted) hybrids were introduced as such (Stace et al. 2015; Stace, personal communication, 2019). In the USA, it is widespread in cultivation and well-naturalized in Washington state and probably elsewhere, occurring in the absence of either parent (McNeill 2002). Individuals of *H. X massartiana* show a range of intermediacy between the parents, and in particular, have slightly one-sided racemes, slightly recurved tepals, stamens that are variable in length, and bluish or whitish anthers (Sell & Murrell 1996). The escaped *H. X massartiana* plants discovered in Ouachita County showed a range of inflorescence and perianth morphology intermediate between the two parental species, with some plants favoring more so the inflorescence and perianth morphology of *H. non-scripta*. *Hyacinthoides X massartiana* previously only has been documented from North Carolina, Oregon, and Washington (McNeill 2002; Kartesz 2015; USDA, NRCS 2019), making our record, apparently, only the fourth documented occurrence of this taxon outside of cultivation in the USA.

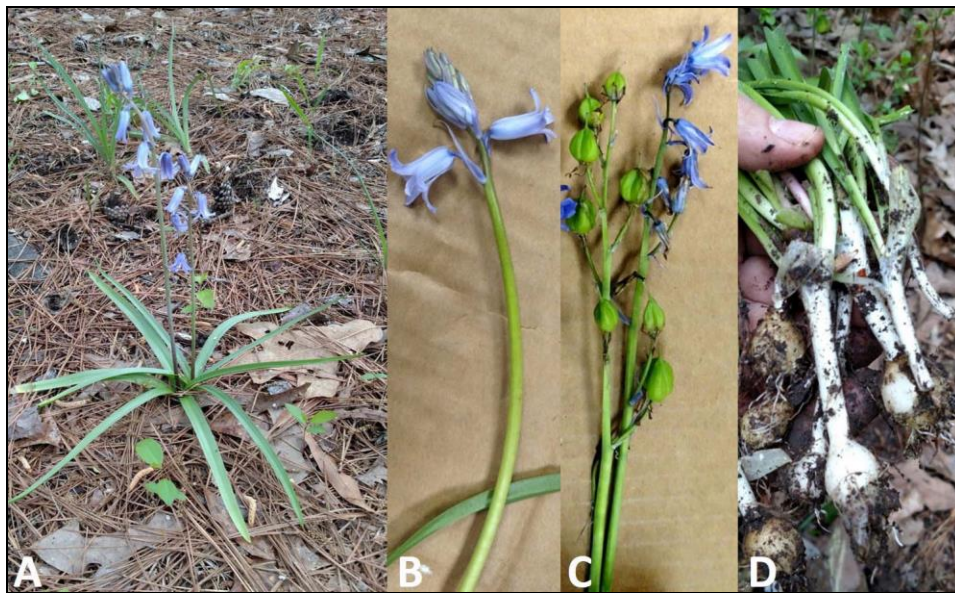


Figure 3. Inflorescences, flowers, fruits, and bulbs from escaped plants of *H. X massartiana* in Ouachita County, Arkansas. A–C. Some of the variation in inflorescence and perianth morphology among plants in the population. D. Bulbs of *H. X massartiana*.

### *Hyacinthus orientalis*

Escaped plants of *Hyacinthus orientalis* were documented from two locations in Clark County, both with open, highly disturbed habitat (Figs. 4–6). Numerous escaped plants of *H. orientalis* were present at one of the two locations, and these plants ranged in development from small, isolated plants that evidently originated from seeds to small clusters, including immature and reproductively mature individuals, produced presumably through a combination of seed production and bulb offsets (Figs. 4–5). Escaped plants were scattered in distribution over a total area of several square meters that included ornamental beds and an adjacent lawn area. Establishment and spread of the escaped *H. orientalis* plants appeared primarily to be via seeds. The origin of the escaped plants presumably is from cultivated plants of the species that also were present at the location. *Hyacinthus orientalis* plants were observed with flowers, and later, with mature fruits. Some establishment via bulb offsets also was apparent.



Figure 4. *Hyacinthus orientalis* in Clark County, Arkansas. A–B. Two separate plants of *H. orientalis* escaped into the edge of a lawn. C. Fruits of *H. orientalis*.

The other location of escaped *H. orientalis* from Clark County had one large cluster of plants, with three smaller plants of various sizes in proximity that almost assuredly were produced via seeds from plants in the larger cluster (Fig. 6). These plants occurred at the edge of a small, wooded greenbelt on top of a steep slope at the dead end of a street in a residential area. The origin of the older plants in the larger cluster is unknown, but establishment from seeds, horticultural discards, or possibly even long-time persistence from cultivation is plausible (several plants of *Narcissus × incomparabilis* also were present). Although houses occur on either side of the street, no homesite existed at the location of the *H. orientalis* plants, as the area where the plants were present only is 1.5–2 meters wide before the edge of the adjacent slope.

**Voucher specimens. Arkansas. Clark Co.:** Numerous plants escaped in disturbed areas of property, including edge of lawn and adjacent ornamental beds — spreading and establishing from cultivated plants, W of Friendship exit off I-30, off Penn Rd. (NW of road), just N of intersection of Penn Rd. and Caney Rd., Friendship, 19 Mar 2019, *Serviss 8662* (HEND); one large group of plants and three smaller plants at dead end and edge of street and adjacent greenbelt, above steep slope, E end of Center St., about 1 block E of intersection of Center St. and 19<sup>th</sup> St., Arkadelphia, 19 Feb 2019, *Serviss 8653* (HEND).



Figure 5. *Hyacinthus orientalis* in Clark County from the same location as Fig. 4. A. Bulbs and offsets from *H. orientalis*; several small offsets may be seen to the left of the larger bulbs. B. Two small, escaped plants in highly disturbed habitat; these plants are a distance of at least 2–3 meters from the nearest *H. orientalis* plants.



Figure 6. *Hyacinthus orientalis* in Clark County from a different location than the plants shown in Figs. 4–5. A. Cluster of plants in narrow, highly disturbed area at end of street (no homesite present), which is above a steep slope of a wooded greenbelt in the city of Arkadelphia; its origin is unknown. B. Small plant (one of three that were present in addition to the larger cluster) presumably produced via seeds from the plants shown in 6A. The plant in 6B is separated from the larger cluster by several centimeters.

*Hyacinthus orientalis* is native to southwestern Asia and is cultivated and naturalized in Mediterranean Europe (Heywood & Regueiro 1980). It was not included in the Liliaceae treatment for Flora of North America (Utech 2002); however, it has been documented outside of cultivation in a number of states in the USA (Kartesz 2015; USDA, NRCS 2019). *Hyacinthus orientalis* frequently is cultivated for its showy, fragrant flowers. Plants of *H. orientalis* encountered in cultivation often show a somewhat distinct morphology, with larger body size and denser inflorescences with more flowers, as compared to the plants documented as escaped in Arkansas.

### *Muscari armeniacum*

In 2019, escaped plants of *Muscari armeniacum* were documented from Clark and Faulkner counties and in 2016 from Hot Spring County (Figs. 7–8). Escaped plants from Faulkner and Hot Spring counties were present in lawns, with additional plants present at the edge of adjacent disturbed woods at the Hot Spring County site. Multiple plants were present at all sites (it is possible, of course, that some of these plants were persistent from cultivation practices; however, a number clearly were escaped). Spread via both seeds and bulblets appeared evident. These records represent the first documented occurrence of *M. armeniacum* in the Arkansas flora outside of cultivation. *Muscari armeniacum* was not included in Smith (1994), Arkansas Vascular Flora Committee (2006), Gentry et al. (2013), nor the Flora of North America treatment (only discussed) of the genus (Straley & Utech 2002). However, it is included in the Flora of the Southern and Mid-Atlantic States (Weakley 2015), where it is listed as persistent and/or escaped in lawns, old fields, suburban woods, and disturbed habitats, and it has been documented in the naturalized floras of California, Illinois, New York, and Ohio (Kartesz 2015; USDA, NRCS 2019).

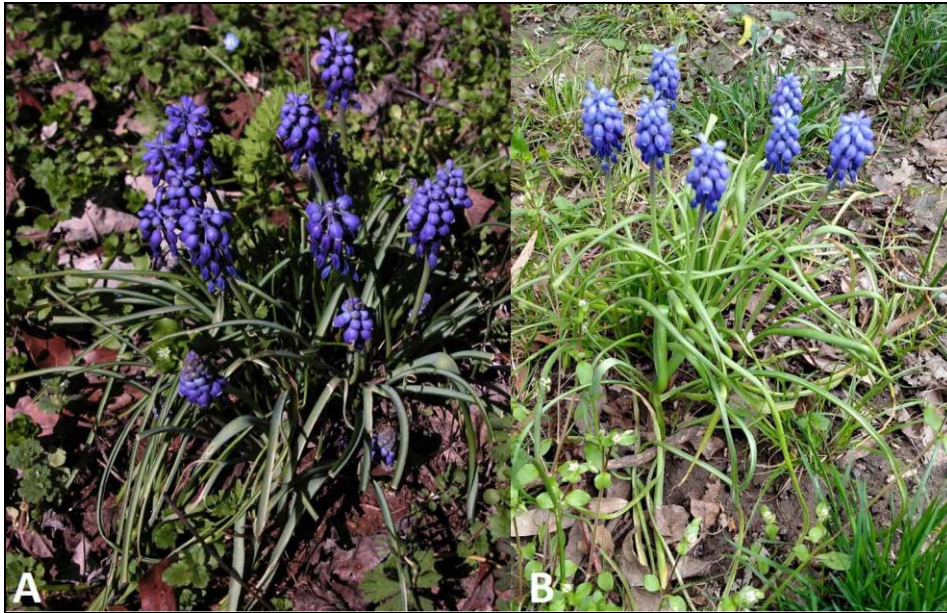


Figure 7. *Muscari armeniacum* plants escaped in Arkansas. A. Hot Spring County in 2016. B. Faulkner County in 2019.

*Muscari neglectum* Guss. ex. Ten. (starch grape hyacinth; Figs. 9–10), which closely resembles *M. armeniacum*, sometimes is cultivated in Arkansas and also is well naturalized in the state and elsewhere in the southeastern USA (Straley & Utech 2002; Gentry et al. 2013; Weakley 2015). The blue-flowered *Muscari* species naturalized in the USA are morphologically similar, and *M. armeniacum* and *M. neglectum* can be difficult to distinguish, especially from dried material (Straley & Utech 2002). The *M. armeniacum* plants documented from Arkansas appear to fit the descriptions of the species as provided by Davis and Stuart (1980) and Sell and Murrell (1996), and at

least some of the Arkansas material resembles the cultivar ‘Christmas Pearl’ based on the tinge of purple color to the flowers and shape of the inflorescences. In addition to the lighter blue flowers, some of the Faulkner County plants had seven leaves (per bulb), another trait attributed to *M. armeniacum*.

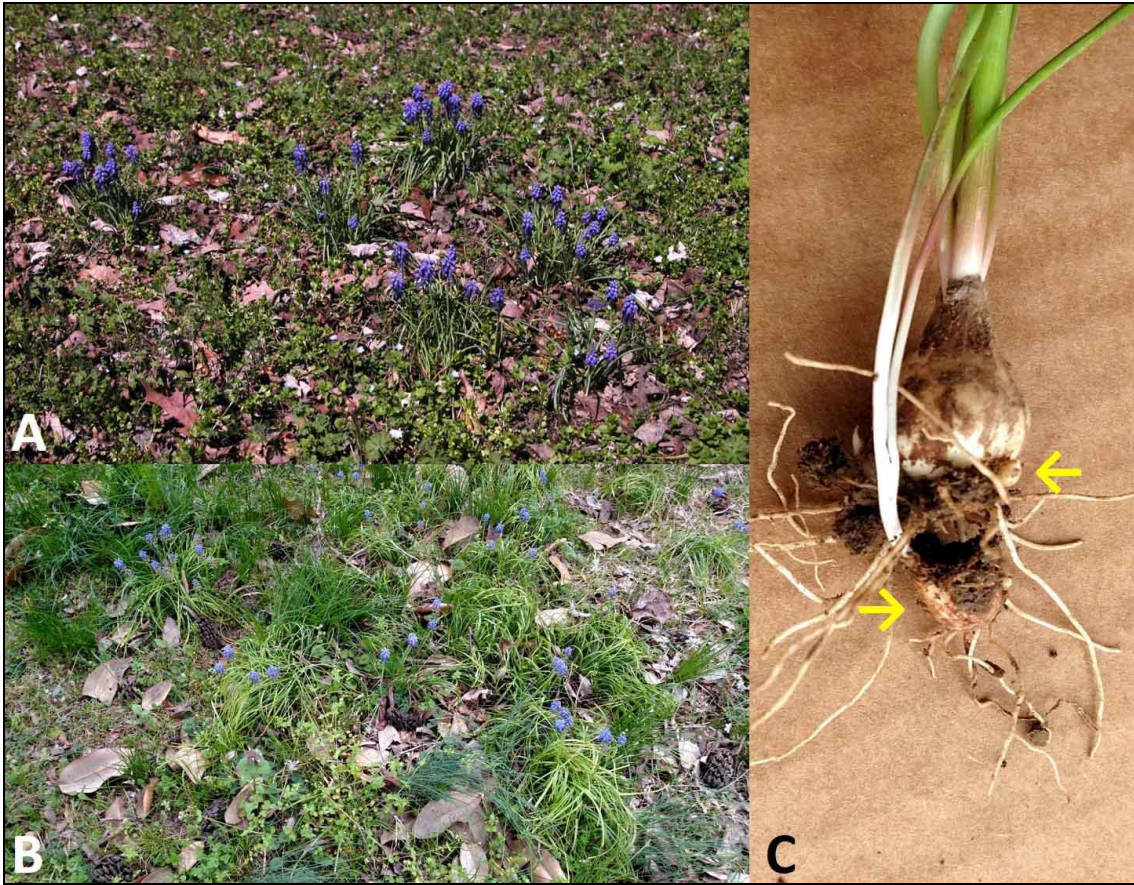


Figure 8. *Muscari armeniacum* escaped in Arkansas. A. Portion of escaped population in Hot Spring County. B. Portion of escaped population in Faulkner County (from one of two sites). C. Bulb showing two offsets (designated by yellow arrows) from one of the Faulkner County plants. All sites had multiple plants present. The Hot Spring County location, in addition to an unkempt lawn area, had multiple plants present at the edge of an adjacent, highly disturbed woods. The Faulkner County site shown in 8B had two to three groups of escaped plants in an unkempt lawn of a vacant homesite.

**Voucher specimens. Arkansas. Clark Co.:** Arkadelphia, many dozens of plants naturalized in open field/lawn area of vacant lot and edge of parking lot, off Pine St., directly NW of intersection of Pine St. and 10<sup>th</sup> St., W of service station, 23 Mar 2019, *Serviss 8663* (HEND). **Faulkner Co.:** Conway, several plants naturalized in lawn of yard and residence, off Clifton St., SW of intersection of Clifton St. and Mill St., 29 Mar 2019, *Serviss 8677* (HEND); Conway, several plants naturalized in weedy lawn of residence, at intersection of Mill St. and Ash St., NE of intersection, 29 Mar 2019, *Serviss 8674* (HEND). **Hot Spring Co.:** Magnet Cove, many plants naturalized in lawn area and edge of woods, weedy, off Smoke Ridge Rd., off Hwy 51, residence at 1979 Smoke Ridge Rd., 17 Mar 2016, *Serviss 8219* (HEND).

As a result of these records, the Hyacinthaceae family in the Arkansas flora is represented by four genera and eight species. Two species of *Muscari* (grape hyacinth) — *M. botryoides* (L.) Mill. and *M. neglectum*, along with *Ornithogalum umbellatum* L. (star of Bethlehem, bird’s milk lily), are known from numerous counties in the state and the latter two species generally occur as weeds of open, disturbed areas — lawns, roadsides, edges of greenbelts, and other waste places. *Muscari* and

at least some *Ornithogalum* species (in Arkansas) apparently spread and naturalize via a combination of seeds and bulblets — *M. armeniacum*, *M. neglectum* (Fig. 9D), and *O. umbellatum* often prolifically produce bulblets from larger bulbs. Seeds and/or bulblets may be transported and dispersed by multiple factors, including water, redistribution of soil, or anthropogenic means. Based on our observations, both *H. X massartiana* and *H. orientalis* also appear to have the potential to be weedy under the correct conditions.

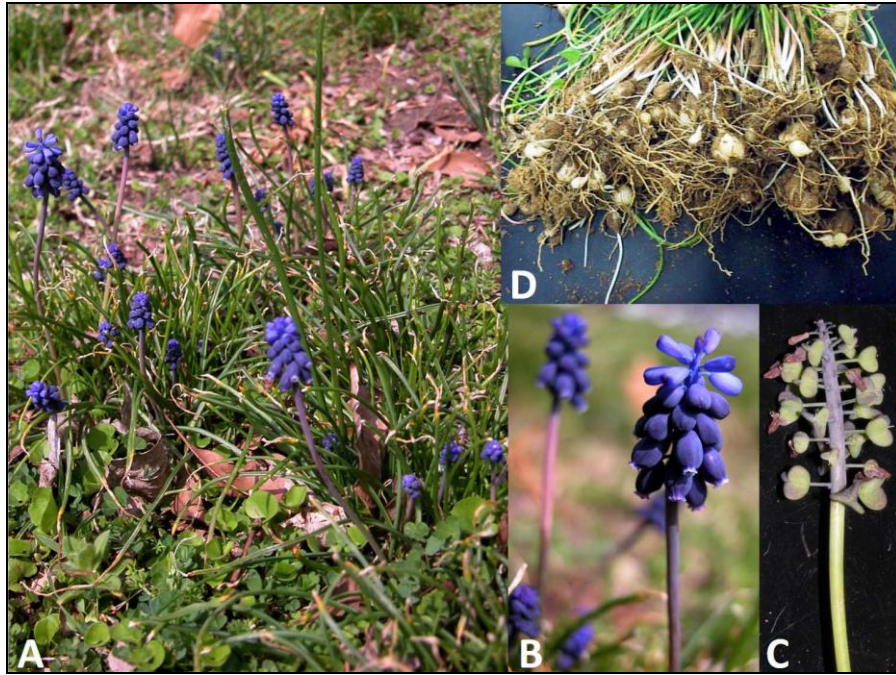


Figure 9. *Muscari neglectum* for comparison with *M. armeniacum*. A. Plant and habit. B. Flowers; notice the dark, almost blackish-blue coloration of the fertile flowers toward the base of the inflorescence — this characteristic helps to distinguish this species from *M. armeniacum*. C. Infructescence and mature fruits. D. Bulbs and bulblets; notice the prolific production of bulblets, which is typical for this species.



Figure 10. Naturalized population of *M. neglectum* in Clark Co., Arkansas. This population is large, consisting of hundreds of plants, and extends considerably beyond what is shown in the photograph.



The blue-flowered species of Hyacinthaceae currently documented from the Arkansas flora can be distinguished using the following key (modified from Davis & Stuart 1980; Sell & Murrell 1996; Straley & Utech 2002; Stace 2010; Weakley 2015).

1. Perianth segments united only basally, nearly separate ..... **Hyacinthoides X massartiana**
1. Perianth segments united one-half or more of their length.
  2. Perianth segments united about one-half of their length; fruits more or less spherical ..... **Hyacinthus orientalis**
  2. Perianth segments united nearly to apices; fruits sharply three-angled.
    3. Perianth globose to ovoid, 1.3–1.5 times as long as wide, lobes strongly recurved; leaves 2–3(–4) in number, 3–8(–12) mm wide, erect, linear-oblancoleate or rarely linear, glaucous on upper surface; bulbs without offset ..... **Muscari botryoides**
    3. Perianth ovoid, obovate, oblong-urceolate, or cylindrical, 2 or more times as long as wide, lobes usually erecto-patent; leaves (2–)3–7 in number, 1–5(–10) mm wide, recurved, generally linear, linear-lanceolate, or rarely linear-elliptic, glaucous or green; bulbs with or without offsets, but often with them.
      4. Flowers 3.5–7.5 mm long, perianth of fertile flowers dark blue, dark violet-blue, or blackish-blue to blackish-purple; leaves 3–6 in number, linear to linear-lanceolate, canaliculate to involute, bright green, upper surface sometimes glaucous ..... **Muscari neglectum**
      4. Flowers 3.5–5.5 mm long, perianth of fertile flowers bright blue or purplish-blue; leaves (2–)3–5(–7) in number, linear or linear-lanceolate, rarely linear-elliptical, often canaliculate, sometimes glaucous ..... **Muscari armeniacum**

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