

## Ornithogalum umbellatum

*Ornithogalum umbellatum*, the garden star-of-Bethlehem, grass lily, nap-at-noon, or eleven-o'clock lady, a species of the genus *Ornithogalum*, is a perennial bulbous flowering plant in the asparagus family (Asparagaceae). *O. umbellatum* is a relatively short plant, occurring in tufts of basal linear leaves, producing conspicuous white flowers, in a stellate pattern, in mid to late spring. The flowers open late in the day (hence some of its common names), but when closed have a green stripe on the outside. It is native throughout most of southern and central Europe, and north-western Africa. *O. umbellatum* is often grown as a garden ornamental, but in North America and other areas it has escaped cultivation and can be found in many areas, where it may become an invasive noxious weed. Parts of the plant are considered poisonous, but are used in some regional cuisines. Essences are also sold as patent remedies. *O. umbellatum* has been depicted in art by artists such as Leonardo da Vinci, and folklore has suggested it originally grew from fragments of the star of Bethlehem, hence its horticultural name.

*O. umbellatum* is a perennial herbaceous bulbous plant (geophyte), dying back after flowering, to an underground storage bulb. The following year, it regrows from the often shallow rooted bulbs, which are ovoid with a membranous coat,[2] 15–25 millimetres (0.6–1.0 in) long and 18–32 mm (0.7–1.3 in) in diameter. The bulbs form multiple leaf-bearing bulbils that soon separate but remain close by.[3] Initially the plant forms 6–10 basal leaves, that arise in tufts from the bulbs. The leaves are grooved (canaliculate), smooth (glabrous) and linear with a white to light green linear midrib on the upper surface, and grow up to 30 centimetres (12 in) long and 8 mm (0.3 in) broad.[4]

*O. umbellatum* is scapose, with a glabrous flower stem (scape) that emerges from the leaf tufts later and is about 10–30 cm (4–12 in) in height, tapering at its tip.[2]

The inflorescence bears 6–20 flat star shaped flowers on ascending stems (pedicels) (3–3.5 cm (1.2–1.4 in)) associated with membranaceous leaflets (bracts) (2.5–3 cm (0.98–1.18 in)) in an open branching umbrella (umbel) shaped terminal cluster, described as a corymbose raceme.[3] The petal-like perianth is radially symmetric (actinomorphic), which is 1.5–2 centimetres (0.6–0.8 in) in diameter, consists of six lanceolate tepals which are white with a green stripe on the underside (outside), 15 mm (0.59 in) in length and 5 mm (0.20 in) wide. From the outside the closed flower appears green with white margins.[2]

The reproductive parts consist of both male (androecium) and female (gynoecium) parts (hermaphrodite). The androecium has six yellow-brown stamens that are free of the perianth and form two groups, each of about 5–8 millimetres (0.2–0.3 in), with filaments that are simple and flattened and oblong anthers that are 2–4 millimetres (0.079–0.157 in). The gynoecium has a single pistil with a superior (i. e. above the floral parts) ovary that is ovoid to obovoid, 3–4 millimetres (0.1–0.2 in), and longer than the style that extends above it. The fruit is a capsule which is oblong-ovoid with 3 sides and 6 ribs. Within it, each locule contains many seeds with a black coat of phytomelan (see Floral diagram).[5][6] The species is polyploid (having more than two sets of chromosomes).[7]

*Ornithogalum umbellatum* has been known and described for a long time, according to some

authors, as far back as Dioscorides in the first century.[8][9][10] In 16th-century England, William Turner (1562) mentions it.[11] In Henry Lyte's 1586 *New Herbal* (a translation into English of Dodoens' 1554 *Cruydeboeck*), reference is made to an *Ornithogalum* as the White Field Onion. John Gerard, in his *Herball* of 1597, describes *Ornithogalum* as the "star of Bethlem".[12] The species known today as *Ornithogalum umbellatum* was first formally described by Linnaeus (1753),[13] who is the botanical authority for the species (L.). *O. umbellatum* is the type species of the genus *Ornithogalum*, which contains about 50 species.[14] The lectotype (reference specimen) was established by Stearn in 1983.[15]

The species epithet reflects the flower formation as an umbel.[16] The plant's many common names include garden star-of-Bethlehem,[17] sleepydick,[18] nap-at-noon,[7] grass lily, summer snowflake, snowdrop, starflower, bird's milk, chinkerichee, ten-o'clock lady, eleven-o'clock lady, Bath asparagus, and star of Hungary. The references to the time of day reflect the opening times of the flowers, opening late and closing at night or in cloudy conditions. The star names indicate the arrangement of the petals and bird's milk is a literal translation of *ornithogalum*. [19][20][21] It has also been called dove's dung, equating it with a plant described in the bible.[22] [23] The name star-of-Bethlehem is shared by a number of species of *Ornithogalum*, due to the white stellate flowers, and the folklore relating the flower to the biblical star-of-Bethlehem (see In popular culture).[24]

A native of most of Europe,[25] North Africa and western Asia, *Ornithogalum umbellatum* has been adopted as an ornamental garden plant from where it has escaped and naturalised widely in North America,[7] where it is considered an aggressive noxious weed of lawns, gardens and no-till agricultural land, which can be difficult to eradicate.[23] In Europe its range extends from Ireland[26] and Portugal in the west, Italy in the south, north to parts of France and east to Turkey[2][16][18] and the Levant.[27]

*O. umbellatum* prefers damp habitats, being found along rivers, streams, and lower, wet areas of pastures.[23] It is tolerant to shade and soil type.[28]

*Ornithogalum umbellatum* is thermoperiodic, requiring a cold winter to complete its life cycle.[29] It first appears in early spring as tufts of leaves, prior to flowering (proteranthous), which occurs in late spring (May–June), the leaves fading prior to blooming. It reproduces by its bulbs, which form many offsetting bulbils that can be dispersed by water.[2] Like many bulb plants from temperate regions, a period of exposure to cold is necessary before spring growth can begin. This protects the plant from growth during winter when intense cold may damage it. Warmer spring temperatures then initiate growth from the bulb. *O. umbellatum* spreads aggressively in clumps by means of these offsets.[16][30]

The flowers are insect pollinated, but may also be self-fertile, forming seeds in summer (June–July).[28] Seed dispersal plays a relatively minor role in propagation, but accounts for isolated blooms.[29]

The petals exhibit photoperiodism, often opening at noon and closing at night or on cloudy days.[7]

*Ornithogalum umbellatum* requires considerable moisture during winter and spring, but can tolerate summer drought. It can be grown in a woodland garden as semi-shade is preferable. It is hardy to zone 5 UK,[28] 4–9 USDA, and can become invasive. It is produced commercially as an ornamental garden plant.[20] To control invasive tendencies, it is best to plant in a container or an edged area.[31] *O. umbellatum* may be grown as an indoor

plant.[32]

The plant, especially the bulb and flowers, contains cardiac glycosides, specifically convallatoxin and convallaside which are toxic to humans and livestock.[2][6][7] Symptoms of poisoning include nausea, salivation, vomiting, diarrhea, and shortness of breath, as well as pain, burning, and swelling of lips, tongue, and throat. Prolonged contact may lead to skin irritation.[23][33]

Despite the known toxicities, the plant has been described as edible for 2000 years[8][34] and incorporated into some traditional regional cuisines (e.g. Turkey)[35] and traditional medicine (e.g. India).[36] In Britain, the plant has long been the subject of herbals for its claimed culinary and medicinal properties.[12][10] This includes drying and grinding the bulbs, or boiling them and baking the flowers into bread.[30][37] Essences are sold as patent remedies and for aromatherapy,[30] such as Bach flower remedies.[38][39] Medical authorities advise against ingesting any part of the plant.[40]

Leonardo da Vinci drew *O. umbellatum* and included the plant in one of his depictions of Leda and the Swan (1508–1515), in which the flowers are held in Leda's left hand.[41][42] In folklore, the biblical star of Bethlehem is said to have fallen to the earth and shattered into pieces which became the ubiquitous white flowers.[24] Legend has also associated it with the journeys of Crusaders and pilgrims to the Holy Land.[37]

A biblical passage in 2 Kings 6:25 relates an account of a siege in Samaria in which the desperate population consumed the excrement of doves (*chiryonim*). "There was a great famine in Samaria; and behold, they besieged it, until a donkey's head was sold for eighty shekels of silver, and a fourth of a kab of dove's dung for five shekels of silver". There has been considerable discussion as to the exact meaning of this term. In notes taken by Paul Dietrich Giseke from a lecture by Linnaeus[34] it is suggested that this *Stercus Columbarum* was in fact the plant *Ornithogalum umbellatum*, which grew abundantly in Palestine and "*unde Anglis Bethlem's Star dicitur*" (is known to the English as Bethlem's Star), the white colour of which resembled the excrement of birds, hence the name *lac Avium* (bird milk or *Ornithogalum*), and which was still eaten by the poor of that country.[43][44]

Culturally, the flower has been associated with purity and hope, atonement and reconciliation.[30]

Grass lilies have importance and symbolism in the Metal Gear Solid video game series as they make multiple appearances. Naked Snake fought his mentor, The Boss, in a field full of white grass lillies in Metal Gear Solid 3: Snake Eater. In Metal Gear Solid 4: Guns of the Patriots, Arlington National Cemetery, where The Boss's and Big Boss's graves are, is also full of the flowers. In Metal Gear Solid V: The Phantom Pain, besides Snake's hospital bed, there is a vase of the flowers, when an assassin tries to kill him, the vase falls and petals float in slow motion in front of him.

