...going one step further

T21024

Meadow Clary (Salvia pratensis)

English

Meadow clary belongs to the family of labiates (Lamiaceae), of which around 200 genera and around 3,000 species are spread the world over. For the most part, they are herbaceous plants and shrubs and rarely arboreal.

Lamiaceae are characterised by decussate foliage (whorled foliage is less common), which in turn also determines the tetragonal stalk. The leaves, with their numerous capitate hairs containing essential oils, endow many species with diverse uses for cooking and medicinal purposes. The name is derived from the labiate flower which develops from the five sepals (calyx leaves). The helmet-shaped upper lip (1), which may be straight or curtate, consists of two petals, and the lower lip (2), which also serves as a landing area for insects, is made up of three petals. At the base, the petals form a narrowing tube. In the case of meadow clary, no hair ring is found on the inside. The four stamens appear in two pairs of uneven length (didynamous) which are generally found adjacent to the upper lip and between which a style or pistil (3) is present. The pistil ends in two short stigmatic branches (4). The pistil originates from the stamen (5) which consists of two fused carpels that disintegrate into 4 mericarps (nutlets) during maturation. The nutlets are spread by the wind, but also via mucous mericarps that stick to insects and animals (epizoic). The five fused sepals (6),which are likewise found at the base, possess either open leaf lobes of uneven length, as typical with labiates, or also have a bilabiate structure.

The herbaceous meadow clary, whose flowering period is May to August, is chiefly found in drier locations such as dry grasslands and chalky soil, and can even grow at altitudes of nearly 1,500m.

The short-stalked flowers of the meadow clary plant, which are formed only in the second to fourth year, are grouped in 6-12 pseudo-verticils – each verticil holds around 4-6 flowers – one above the other in the axils of green bracts, and form racemes with lengths of up to 30cm. The single flowers are approximately 3cm long. The colours vary from dark blue to pink and white.

Pollination is effected by a complex lever mechanism that was recorded and described as far back as 1793 by Christian Conrad Sprengel in Das entdeckte Geheimnis der Natur im Bau und in der Befruchtung.

The flowers are proterandrous, i.e. the stigmatic branches spread only after the pollen sacs have been emptied. As typical with the genus Salvia (which includes approximately 900 species), fertile pollen is produced by only two stamens (the longer pair) which also possess special structural features. The second – shorter – pair has been reduced to sterile, rudimentary staminodes.

Whereas normally the two fertile thecae (each possessing 2 pollen sacs) are separated by only a narrow sterile area (the connective (7)), this has been transformed, in the case of Salvia, into two axial limbs of unequal length, which push the two thecae wide apart.

Only the theca pointing upward (8) possesses fertile pollen in two pollen sacs. The upward pointing is due to the upper connective limb, which is longer (up to 8mm long) and corresponds to the helmet-shaped upper lip.

The second sterile theca is situated in the region of the corolla tube above the lower connective limb, which is shorter in length. It acts as a pressure pad (9) and prevents unrestrained access to the nectary (10) at the base of the flower.

The origin of the connective at the filament (13) acts as a lever joint (11).

Pollinators and other „flower visitors“ (mostly bees and worker bumblebees, but also butterflies and moths) land onto the lower lip, which acts as a path to the nectar (12) and indicates the direction to the centre of the corolla tube.

Due to the narrowing corolla tube, the visitors inevitably press their heads against the contact pressure point (sterile theca) and set the mechanism in motion: the fertile theca with the pollen is moved downward by the leverage and releases pollen onto the visitor's back, where it sticks fast to the dense, furry coat.

After the pollen sacs have been emptied, the pistil stretches forward into its original position, while the stigmatic branches, now empty, spread out their sticky papilla to receive the pollen brought by the next visitor from the same spot on his back.

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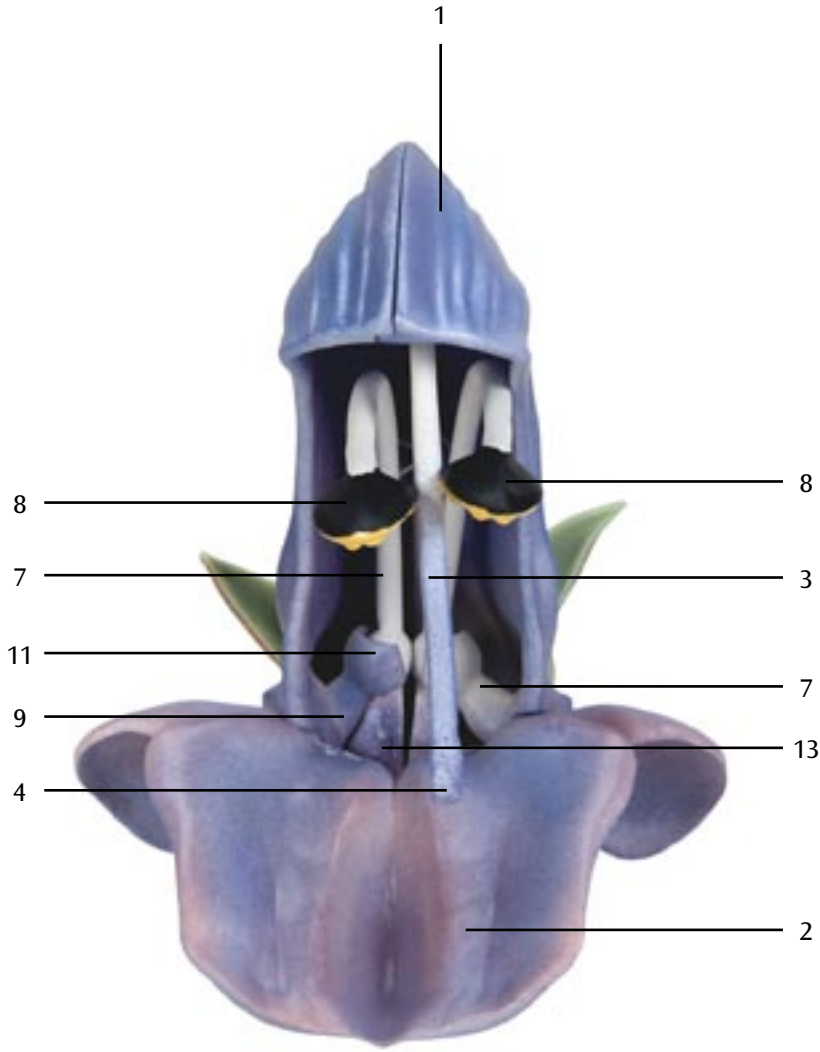
1 Upper lip
2 Lower lip
3 Pistil
4 Stigmatic branches
5 Stamen
6 Sepal
7 Connectives
8 Fertile thecae
9 Contact pressure pad(s) (Filament)
10 Nectary
11 Lever joint (Origin of the filament)
12 Path to nectary
13 Filament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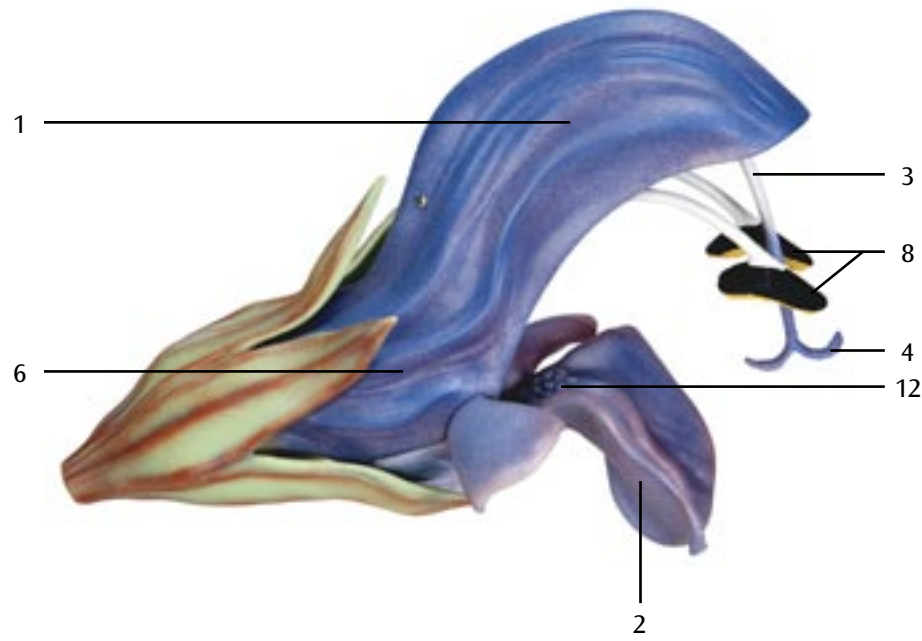
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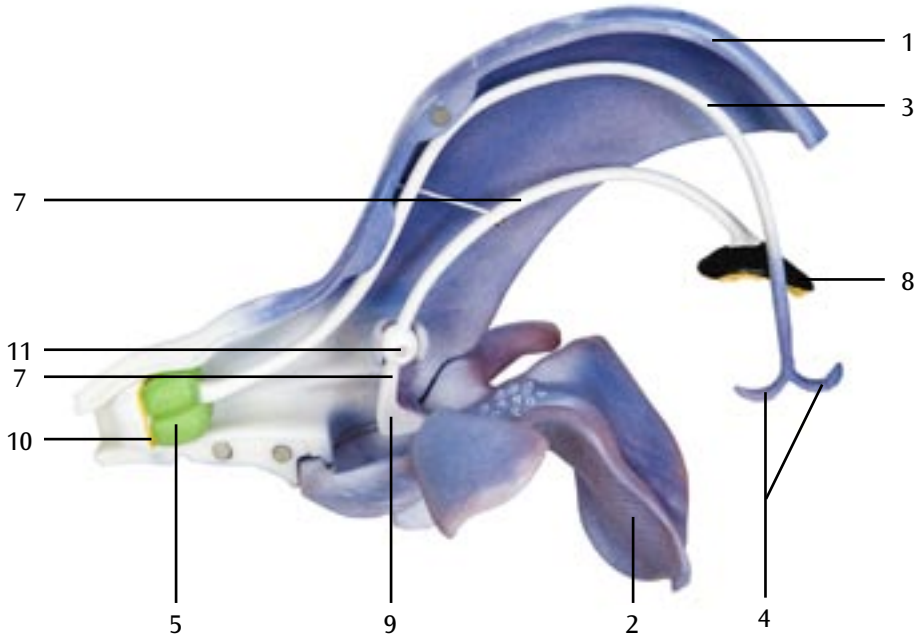
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