

A short guide to spring-flowering Crocuses

Introduction

The Crocus genus is part of the Iris family Iridaceae. It is native to the Old World, ranging from Morocco and Portugal through the Mediterranean and Central Asia to western China. There are around 100 species (and counting!); they do not hybridise freely in the wild, but the situation is complicated by a few artificial hybrids and many cultivars. Fortunately for anyone wanting to record them in Britain, only a few taxa are readily naturalised here.



The key in Stace (2019) provides a good starting point for getting to know them, and the main purpose of this guide is to expand on the detail and highlight some of the forms that may be encountered that do not fit easily into a key.

Crocus anatomy and ID features

The aerial parts of most members of the Iris family spring from a rhizome (for instance, Irises) or a corm, which is a swollen root-like underground part of the stem. Unlike a bulb, the growing tip of the stem is not surrounded onion-like by scale leaves or leaf bases.

Features of the corm (in particular, the membranous outer covering, called the tunic) are important in classifying Crocuses. This is very useful for horticulturalists handling unplanted material, but not so good for field botanists! But should you have a Crocus in the hand, here are some of the types of sculpturing you can find in Crocus tunics, mentioned later in the accounts.



Crocus ancycensis - a coarse network of fibres



Crocus laevigatus - a smooth onion-like skin



Crocus chrysanthus - a cap and transverse rings



Crocus etruscus - parallel longitudinal fibres



Crocus vernus - a fine network of fibres

Leaves

The early leaves, known as **cataphylls**, are papery and whitish and sheath the shoot. They should not be confused with bracts. The mature leaves of Crocus are narrow and linear. In autumnal crocuses they tend to appear after flowering, in spring crocuses they usually accompany the flowers. They are more or less two-sided, but usually with a keel and grooves on the back; the former can be quite prominent and the 'wings' curved back, so they can hardly be described as flat. Almost all species (all those likely to be found naturalised in Britain) have a white stripe on the upper side.

Inflorescence



C. etruscus single
bract



C. dalmaticus
bract and bracteole

The flowers are borne singly on a stalk (the **scape**), although occasionally more than one scape can arise from the shoot. The scape is not visible above ground until fruiting time.

There are up to three membranous sheaths enveloping the stem.

- The **prophyll** which starts at the top of the corm and runs some way up the scape. It will be hidden at flowering time. If there is more than one scape, one prophyll wraps them all.

- The **bract** which arises from the top of the scape and wraps the ovary and the floral tube, and will normally be partially visible above ground at flowering time.

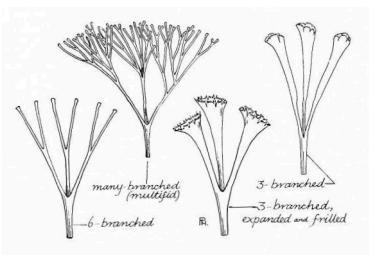
- Above the bract there may be a **bracteole**, also visible above ground when present.

When both bract and bracteole are present, whether they are different in length and/or breadth can be a useful ID feature.

Flowers

The tepals of the flower are fused at the base into a long **perianth tube** which acts in place of a stalk to hold the main part of the flower above ground. Above the tube are six perianth segments with an inner whorl of three and an outer whorl of three. The tepals are variously coloured, ranging from white through pale mauve to deep purple and from cream through bright yellow to orange. They can be zoned, blotched or striped in contrasting colours.

There are three stamens which arise from the perianth at the top of the tube. Size and sometimes colour of anthers can be useful ID features.



Styles are among the most useful recognition characters. At their simplest, they are divided into three simple style branches. But they may have variously sculpted tips, or divide again to give six, or repeatedly to give feathery or tree-like structure. Style colour and the relative lengths of style and stamens can be useful in ID too.

Fruit



The ovary ripens into a capsule with three compartments, each of which bears two rows of seeds. This is useful for recognising that a fruiting plant may be a Crocus, but there are few useful characters for distinguishing species.

A gallery of *Crocus* features: *C. tommasinianus*



Corm, with **tunic** showing longitudinal narrow lattice



Tip of innermost **cataphyll** (papery sheathing leaf arising from the tunic)



Immature **ovary**



Top of **perianth tube** and **perianth segments** (3 inner, 3 outer)



Stamens and frilly **stigma branches**



Tip of **bract** (no **bracteole** in this species)



Identifying common spring-flowering Crocuses

Ground colour of flowers cream to bright yellow or orange **Table 1**

Ground colour of flowers white, pale to deep purple, sometimes with yellow throat . **Table 2**

Table 1	C. chrysanthus	C. ancyrensis	C. flavus	C. x luteus
Tunic	Splitting horizontally into entire or toothed rings at base of corm	A coarse lattice of fibres	Membranous with fibrous points at top, coarse parallel fibres at base	Rather coarse longitudinal fibres, not or obscurely netted
Leaves	0.5-2.5mm wide, glabrous or pubescent	0.5-1(-1.5)mm wide, glabrous	2.5-4mm wide; glabrous, papillose or ciliate on margins; sometimes pubescent on surfaces (subsp. <i>dissectus</i>)	0.5-1.5(-4)mm wide, glabrous
Bracts	Bract and bracteole unequal; bracteole much narrower	Bract and bracteole \pm equal or latter slightly shorter	Bract and bracteole very unequal; bract broad and sheathing narrow linear bracteole	Bract and bracteole unequal to \pm equal, latter slightly narrower
Flower ground colour	Pale yellow to orange-yellow, rarely white	Bright yellow or orange	Pale yellow to deep orange-yellow	Pale to mid yellow
Flower markings	Sometimes suffused or streaked bronze, purple or white	Sometimes stained purple at base	Sometimes suffused or striped brownish	More or less suffused or striped purplish-brown on outer segments
Perianth tube	3-7cm; yellow, brown, purple or cream	4-6cm; yellow or purplish	5-15cm; yellow or brownish	3-6cm; yellow or purplish
Perianth segments (tepals)	1.5-3.5(-4)cm, \pm equal	1.5-3cm, \pm equal	2-3.5cm (subsp. <i>flavus</i>) or 1.5-3cm (subsp. <i>dissectus</i>), \pm equal	1.7-3.4cm, \pm equal
Filaments	3-6mm, yellow, glabrous or papillose	2-4mm, yellow, glabrous	3-7mm, yellow, glabrous or pubescent	2-4mm, yellow, papillose-pubescent near the base
Anthers	6-14mm, yellow, sometimes black at base or blackish before anthesis	8-13mm, yellow	8-15mm, yellow	8-13mm, yellow
Style	Divided into 3 yellow to reddish-orange branches, slender or expanded at tip, slightly shorter than to slightly exceeding anthers	Divided into 3 yellow to reddish-orange branches, slender or occasionally slightly expanded at tip, shorter than to slightly exceeding anthers	Barely divided into 3 stumpy yellow to orange branches, sometimes lobed (subsp. <i>flavus</i>); or 6-15 slender branches (subsp. <i>dissectus</i>)	Deeply divided into 3 yellow to deep orange-red branches, \pm equalling or exceeding the anthers



Crocus chrysanthus (Herb.) Herb.

Discussion: the yellow crocuses

By far the commonest of these crocuses to be found naturalised is *C. x luteus* Lam. (*C. x stellaris* Haw.), which is a hybrid between *C. flavus* (possibly over-recorded for this hybrid) and *C. angustifolius*. The latter has not been recorded as an escape: it is sold under several cultivar names some of which appear to be hybrids, although the oldest known, 'Cloth of Gold', is the species. *C. angustifolius* and *C. ancyrensis* are quite closely related (*angustifolius* has more acute tips to the tepal lobes); *ancyrensis* is very rarely naturalised. *C. chrysanthus* is most closely related to *C. biflorus* in the 'purple' group, with which it can hybridise; it has several creamy or bronzy flowered cultivars. It is fairly frequently recorded as an escape.

The first feature for distinguishing *C. chrysanthus* from the others in the table is unfortunately the least accessible in the field, being the rings at the base of the corm. However the narrow bracteole separates it from all except *C. flavus*, and leaf width, the simple slender style branches and generally shorter perianth tube will usually suffice to distinguish it from that.

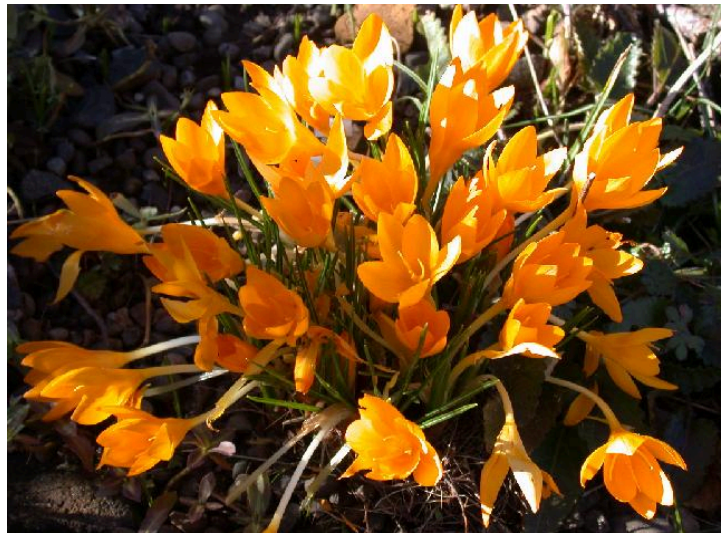
White-flowered forms of *C. chrysanthus* can be very difficult to name to species, as they are almost indistinguishable from *C. weldenii* (often considered a subspecies of *C. biflorus*).

C. ancyrensis has few characters to distinguish it readily from *C. x luteus*, unless you are lucky enough to have a broad-leaved example of the latter. The colour range can also be helpful where you have one or other extreme, and in general styles will overtop the anthers in the hybrid.

The wider leaves of *C. flavus* will separate it from the other species in most cases except broad-leaved *C. x luteus*; here the very narrow bracteole and the differences in style branches will normally suffice.

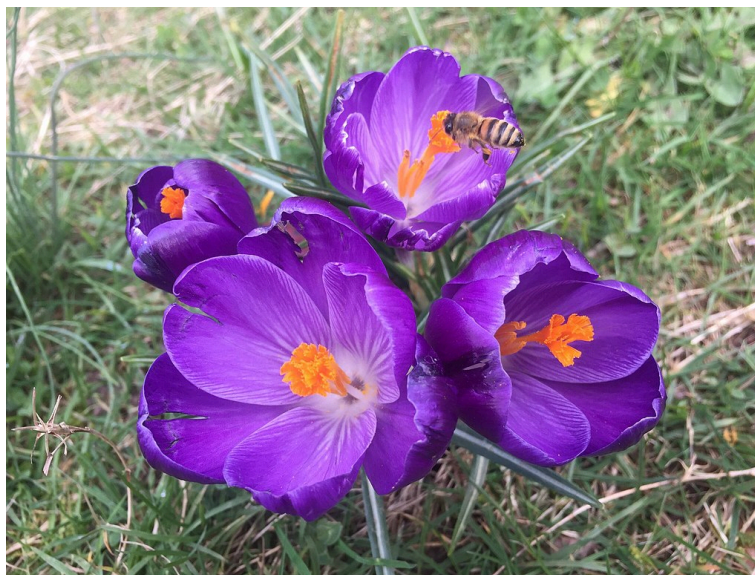


Crocus x luteus Lam.
Note darker stripes on back of tepals



Crocus flavus Weston.
Note long perianth tubes

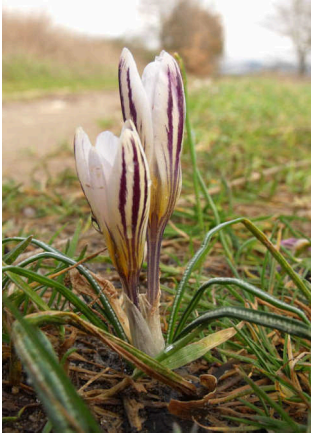
Table 2	<i>C. biflorus</i> complex	<i>C. sieberi</i>	<i>C. tommasinianus</i>	<i>C. vernus</i> complex
Tunic	Leathery or membranous and sometimes splitting vertically at top, splitting horizontally into or toothed rings at base of corm	A fine or coarse lattice of fibres, forming a persistent neck at top or not	Finely fibrous, parallel or obscurely latticed	Finely fibrous, parallel or obscurely latticed
Leaves	0.5-2.5(-3.5)mm wide, glabrous	0.5-3(-6)mm wide, glabrous	2-3mm wide, glabrous, with a bold white stripe	(2-)4-6(-8)mm wide, glabrous, ciliate or pubescent, with bold white stripe
Bracts	Bract and bracteole \pm equal, or bracteole slightly narrower	Bract and bracteole \pm equal or latter much shorter	Bracteole absent	Bracteole absent
Flower ground colour	White or lilac-blue; throat white, yellow or yellow / white sometimes with bronze-brown blotches or black staining	White or pale to deep lilac-blue; throat pale to deep yellow or orange	Pale lilac to purple, often silvery on outside; throat white	White, lavender or purple; throat white or purplish
Flower markings	3 purple or brownish bands on outer three segments and often dark feathering, or unstriped and pale brown	Usually with a longitudinal stripe and feathering, horizontal bands or a wash of purple	Sometimes with darker tips on segments	Sometimes striped purple (or striped white on purple ground) or with purple apical markings
Perianth tube	3-6(-10)cm; off-white or pale purple	2.5-5(-7)cm; white or purplish, often yellow-stained at apex	3.5-10cm; white	5-15cm (<i>C. neapolitanus</i>), 2.5-6(-9)cm (<i>C. vernus</i>); white or purple (always purple if rest of flower is)
Perianth segments (tepals)	1.8-3(-3.5)cm, \pm equal or outer slightly narrower	2-3(-4)cm, equal	2.4-4.5cm	2.5-3-5.5cm (<i>C. neapolitanus</i>), 1.5-3cm (<i>C. vernus</i>), \pm equal
Filaments	2-5(-7)mm, yellow, glabrous or sparsely papillose / pubescent	3-7(-10)mm, yellow, glabrous	5-7mm, white, glabrous	5-14mm, white, glabrous
Anthers	6-11(-13)mm, yellow, sometimes black at base, or maroon to black	8-12(-17)mm, yellow	10-15mm, yellow	10-18mm (<i>C. neapolitanus</i>), 5-11mm (<i>C. vernus</i>), yellow
Style	Divided into 3 white, yellow, reddish or orange glabrous or densely papillose branches, expanded at tip, equalling or exceeding anthers	Divided into 3 yellow to reddish-orange branches, much expanded at tip and frilled or lobed, slightly shorter than to slightly exceeding anthers	Divided into 3 orange branches much expanded and frilly at apex, slightly shorter than to slightly exceeding anthers	Shortly divided into 3 deep yellow to orange branches much expanded and frilly at apex, exceeding the anthers or occasionally equalling them



Crocus neapolitanus (Ker Gawl.) Loisel.

Discussion: the white to purple crocuses

The four dealt with here conveniently break down into two pairs: *C. biflorus* complex and *C. sieberi*, which always have both bract and bracteole, and usually have some yellow in the throat colour; and *C. tommasinianus* and *C. vernus* complex, which lack a bracteole and have white or purplish throats.



C. biflorus Mill. : a white form.
Note heavy markings,,
yellowish throat

C. biflorus is a huge complex of geographical races found from SE Europe into Asia, with a major centre in Turkey. The classic works on Crocus treat them as subspecies, but Kew makes them species. If you want to delve into them more deeply, then Rukšans (2010) has a key and Mathew (1982) has full botanical descriptions. However, the situation is further complicated by cultivars, including those which are hybrids with the closely related, usually yellow-flowered *C. chrysanthus* which can take on varied colour forms.

Again, the least convenient way in the field to distinguish *C. biflorus* complex from *C. sieberi* is the splitting of the tunic at the base into concentric rings. Other than that, the best distinctive features of *C. sieberi* are the usually more heavily marked outer tepals of *C. biflorus*, the more prominently marked and sometimes deeper-coloured throats (generally without white banding) of *C. sieberi* and its tendency to more ornamented style branches.

Both these species are rather rarely recorded in the wild in Britain, but this may well be through nervousness about ID.



C. tommasinianus Herb. Note
slender form, long perianth
tube, no dark markings on
throat.

C. tommasinianus is one of the commonest recorded escapes, and usually the earliest to flower. When the flowers are closed, it is distinctive in its overall slenderness (*C. vernus* is chunkier) and silvery to pale purple outward parts. When they open to full sunlight, the perianth segments make a shallow bowl or near-star,

C. vernus is a very common montane and European native group of plants widely grown and naturalised in Britain.

The *C. vernus* complex comprises two or three species, depending on your point of view. Stace (2019) lists two: the larger-flowered, purple-flowered *C. neapolitanus* (Ker Gawl.) Loisel. and the smaller-flowered, white *C. vernus* (L.) Hill. To confuse matters, the former was formerly known as *C. vernus* Hill. subsp. *vernus* and the latter *C. vernus* subsp. *albiflorus* (Kit. ex Schult.) Asch. & Graebner. These can be separated on the floral dimensions given in the table; also, the styles of *C. neapolitanus* clearly overtop the anthers, while those of *vernus* do not. There are white forms of *C. neapolitanus* but they have those *neapolitanus* characters.

Rukšans names these two respectively *C. vernus* and *C. albiflorus*, and also recognises a third species, *C. heuffelianus*, from eastern Europe. It has darker markings on the tips of the perianth segments; a particularly attractive cultivar is 'Carpathian Wonder', which is pure white with elegant deep purple markings; usually the markings on white flowers are a paler blue. It has two geographical races; there are races with styles exceeding the length of the anthers and roughly equalling them.

Hybrids

Hybridisation in the wild is fairly rare and surprisingly, even in cultivation spontaneous hybridisation is infrequent and mostly confined to a few species. Hybrids are often sterile. Nevertheless, some hybrids are commonly cultivated and have given rise to important cultivars.

There are three species groups in which hybrids mostly occur.



Crocus x leonidii 'Early Gold'

C. x luteus, the hybrid between the not very closely related *C. flavus* and *C. angustifolius*, which has been dealt with in the main text and includes the large 'Golden Yellow', an old hybrid. In more recent years several cultivars have been produced from *C. reticulatus* and *C. angustifolius* (both in Series Reticulati). These go under the name *C. x leonidii*, are usually pale to mid yellow and some have particularly bold dark stripes or feathering on the outer tepals.



Crocus 'Jeanne d'Arc'

The *C. vernus* group (Series Verni), where hybrids of *C. neapolitanus* produce very robust flowers in a wide variety of colours from white through to deepest purple, with varying degrees of white or dark purple streaking. These are generally referred to as 'Crocus x cultorum' (not a recognised botanical name). *C. tommasinianus* also forms hybrids, mostly with *C. neapolitanus*. The former can vary greatly in deepness of colouring, but plants with the overall slender habit of *tommasinianus*, slightly larger and more bulbous flowers and a pale ground colour with dark purple on a limited area of the throat are good candidates.



Crocus 'Jürpils'

C. chrysanthus and the *C. biflorus* aggregate. As previously noted, these are closely related (Series Biflori) species, and many of the Crocus hybrids occurring naturally in the wild are of these two. Of course, the gardeners have also weighed in, and many of the cultivars sold under one or other of the species names are actually hybrids. Colours are variable but most will have yellow and/or white coloration in the throat.

Confusibles

There are three genera which may be met with as native or escaped plants in Britain, and could be confused for Crocuses.

***Romulea* (Sand Crocus)** is also in the Iris family, and so also has 3 stamens. The leaves are more or less rounded with 4 grooves, rather than having two faces with varying degrees of midrib sculpturing underneath. The perianth tubes is always shorter than the segments. The same flowering stem **may** bear more than one flower (don't confuse this with the ability of *Crocus* to bear more than one stem from the same corm). At flowering time the ovaries are above ground; in *Crocus* they are still below.



Romulea columnae, Channel Islands

***Colchicum* (Meadow Saffron)** is either in the Lily family Liliaceae or in its very own family Colchicaceae, depending on how up to date you wish to be. Whichever, it shows its Lily heritage in having 6 stamens, not 3. It has 3 stigmas which are unbranched.



Colchicum cupani, Mediterranean

***Sternbergia* (Winter Daffodil):** the vernacular name seems odd, as it looks like a *Crocus*. It is, however, a member of the Daffodil family Amaryllidaceae. It has a bulb rather than a corm, 6 stamens, and a single style with an undivided stigma. Its ovary is above ground at flowering time. Leaves have only the faintest of paler stripes along the midrib, if at all.



Sternbergia lutea, Greece

References and further reading

Monographs

There are five ‘bibles’ for Crocus lovers in book form. They contain references to many other books and articles, some available on the Internet.

Maw, G. (1886): *The Genus Crocus*, London, Dulau and Co. This is obviously dated but it stabilised the classification, contains useful descriptive information, and can be downloaded for free as a PDF from the Biodiversity Heritage Library (<https://www.biodiversitylibrary.org/bibliography/15481>). Unfortunately the coloured plates do not reproduce very well.

Bowles, E.A. (1952): *A Handbook of Crocus and Colchicum for Gardeners*, revised edn., London, Bodley Head. Now a little behind the times on Crocus taxonomy (new discoveries in the native flora are being made all the time), but with useful information.

Mathew, B. (1982): *The Crocus*, London, Batsford. This is the serious and largely still current mainstream botanical monograph on the genus; more recent updates are mostly additions to the known taxa. It covers morphology and classification of the genus, ID keys, full descriptions of all species and subspecies, notes on flowering times, habitat and distribution, and the other features you would expect of a monograph. Coverage of cultivars and hybrids is mostly quite brief. There are 96 colour plates of hand-drawn illustrations, mostly showing much of the botanical detail.

Rukšāns, J. (2010): *Crocuses: a Complete Guide to the Genus*, London, Timber Press. One might quibble with the “Complete” in the title but its coverage is certainly very broad and as up to date as it could be at time of publication. It is divided up into sections based on flowering times and key identification characters, each section with its own key. Descriptions are not as botanically rigorous or full as Mathew’s, but they include a lot of incidental information on Crocus in the wild and a lot more on cultivars and cultivation. There are over 300 (small) colour photographs of species, subspecies and forms.

Rukšāns, J. (2017): *The World of Crocuses* and **(2023) First Supplement**, Latvian Academy of Sciences. This is the most up to date and comprehensive coverage of the genus, rather less formally presented than Mathew but with a wealth of detail and with over 1700 colour photographs. Expensive if you buy both.

Kerndorf, H., Pasche, E. & Harpke, D. (2015): ‘Crocus: Life-cycle, Morphology, Taxonomy’, *Stapfia* **103**: 27-65, downloadable at: https://www.zobodat.at/pdf/STAPFIA_0103_0027-0065.pdf. A fine account of Crocus biology and recent research, and excellent analysis of key features to study if you want to be really serious about Crocus ID.

Kerndorf, H., Pasche, E. & Harpke, D. (2016): ‘Crocus: Taxonomical Problems and How to Determine a Species Nowadays?’, *Stapfia* **105**: 42-50, downloadable at: https://www.zobodat.at/pdf/STAPFIA_105_0042-0050.pdf.

Standard British Floras with keys to Crocus

Cullen, J. et al. (2011): *The European Garden Flora* (2nd edn.) vol. 1, Cambridge, Cambridge University Press.

Sell, P.D. & Murrell, G. (1996): *Flora of Great Britain and Ireland* vol. 5, Cambridge, Cambridge University Press.

Stace, C.A. (2019): *New Flora of the British Isles* (4th edn.), Middlewood Green, C & M Floristics.

Stace, C.A. (2022): *Concise Flora of the British Isles*, Middlewood Green, C & M Floristics.

Web sites that are useful sources of illustrations

Alpine Garden Society

<http://archive.alpinegardensociety.net/plants/Crocus/information/Crocus%20Group/129/>

Useful information and pictures for many species, subspecies and a few hybrids. Useful comparative photo sets, mainly for corms and styles.

E.A. Bowles Society

<https://www.eabowlessociety.org.uk/crocus>

Background information on the man, photos of his watercolours and a selection of nice close-up photos of cultivated hybrids, especially *chrysanthus* x *biflorus*.

Pacific Bulb Society

<https://www.pacificbulbsociety.org/pbswiki/index.php/Crocus>

A good source of rather generalist photos for species and some cultivars.

Scottish Rock Garden Club Forum

<https://www.srgc.org.uk/forum/index.php?board=10.0>

Lots of chat and some good pictures in some posts.



C. x luteus



C. neapolitanus ? x tommasinianus

Acknowledgements

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- **Martin Rand**

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'Generalrelative': p. 5 (*C. neapolitanus*), licensed under Creative Commons Attribution-Share Alike 4.0 International license <<https://creativecommons.org/licenses/by-sa/4.0/>>, via Wikimedia Commons

'Meneerke bloem': p. 8 (*C. 'Jeanne d'Arc'*); p. 9 (*Sternbergia lutea*) licensed under the Creative Commons Attribution-Share Alike 3.0 Unported license <<https://creativecommons.org/licenses/by-sa/3.0/>>

'Yann', Scottish Rock Garden Club: p. 8 (*C. 'Jürpils'*)

Zeynel Cebeci: p. 4 (*C. chrysanthus*), licensed under Creative Commons Attribution-Share Alike 4.0 International license <<https://creativecommons.org/licenses/by-sa/4.0/>>, via Wikimedia Commons

Mary Sue Itner, Pacific Bulb Society: p. 1 (corm of *C. laevigatus*)

Panayoti Kelaidis, Prairiebreak: p. 8 (*C. x leonidii*)

Jane McGary, Pacific Bulb Society: p. 6 (*C. flavus*)

David Pilling, Pacific Bulb Society: p. 1 (corms of *C. ancyrensis*, *C. chrysanthus*, *C. etruscus*, *C. vernus*); p. 6 (*C. x luteus* 'Yellow Mammoth')

Jeffrey Sciberras: p. 9 (*Colchicum cupani*): licensed under Creative Commons Attribution-Share Alike 3.0 International license CC BY-SA 3.0 <<https://creativecommons.org/licenses/by-sa/3.0/>>, via Wikimedia Commons



Crocus x luteus style