

DOROTHY HYBRID OF SPRING CROCUS**R. B. Saxena***

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ABSTRACT

Crocus hybrid is also known as crocus. Crocus and other little bulb's grow by the thousands years on Mediterranean hillside and have been there since before written history. Crocus hybrid species are native to woodland, scrub and meadows from sea level to alpine tundra in central and southern Europe, north Africa and middle East, on the island of the Aegean and across central Asia to western China. These hybrid species are highly valued as ornamental application. Hybrid spring crocuses carpet the ground with blooms in shades of white, purple, yellow and orange. The taxonomy of this genus is rather confused, and misnaming often occurs in the trade, so many of the so-called species in cultivation are actually hybrids of unknown origin. Botany, taxonomy, infra-specific taxa, distribution, ecology, description, chromosome counts and phenology are provided with key to their identification of dorothy hybrid of spring crocus.

KEYWORD: Crocus, Geographic area, Classification, Cytology, Chromosome, God-gift hybrid of spring crocus.**INTRODUCTION^[1,2]**

Crocus hybrid is also known as crocus. Crocus, along with Jonquils, Grecian wind flowers and other little bilks grow by the thousands on Mediterranean hillside and have been there since before written history. They bloom on 4000 year – old frescoes and ancient jewelry and vases, proof of their tenacity. Crocuses are well known harbinger of spring. Among the first are the ethereal tommies (*Crocus tommasinianus*) in soft propose shades, their dainty blooms making the familiar big Dutch hybrids look almost Clumsy. Date from the 16th and 17th centuries, just above the Monastery, the source of the River Ilissos has been visited since antiquity, its water is reputed to cure sterility. Before the Marathondams was built, the spring was Athens main source of water. Crocus species are native to woodland, scrub and meadows from the sea level to alpine tundra in central and southern Europe, north Africa and middle East, on the island of the Aegean, and across central Asia to western China. Corms of the crocus species can be toxic to some people and other animals if eaten, but there flowering plants are listed as an allergy-safe pollen-producing plant. Crocus hybrid are the perfect choice for spring displays. The stand well alone or grouped with other spring-flowering and foliage plant. They also make and ideal choice for the rock gardens.

BOTANY^[3]

The taxonomic classification of crocus dorothy spring hybrid

01. Division Spermatophyta

02. Sub-division	Angospermae
03. Infra-division	Radiatopses
04. Class	Monocotyledonae
05. Sub-class	Liliidae
06. Order	liliales
07. Family	Iridaceae or Iris
08. Sub- family	Crocoidae
09. Tribus	Croceae
10. Genus	Crocus

Genus crocus

Herb: small, perennial, cormous. Corm: oblate, covered with tunics. Leaves: few, all basal, green, adoxially with pale, median strips, base surrounded by membranous, sheath like. Aerial stem: not developed. Flowers: emerging from ground, with peduncle and ovary subterranean. Perianth: white or lilac to dark purple. Tube: long, slender segments similar, equal or sub-equal. Stamens: inserted in the throat of the perianth tube. Style: 1, slender, distally with 3 to many branches. Capsule: small, ellipsoid or oblong-ellipsoid. Seeds: coats covered with dense mat of papillae.

Series hybrid^[2,4,5]

Crocus hybrid is also known as crocus. Distribution and habitat: crocus species are native to woodland, scrub and meadows from sea level to alpine tundra in central and southern Europe, north Africa and middle East, on the island of the Aegean and across central Asia to western China. Description: crocus species are winter flowering plant which are grown from small corms. Their slender,

grooved leaves or striped two colours. The maximum height of these plants is about 10-12 cm. Outdoors they produce roots and little or no growth during winter months and have a brief flowering period at the beginning of the spring. After this, most of leaves grow die down with a couple of the months. Flowers will last from two to five days, but plant can last from 7 to 12 days. The lasting quality will vary greatly by cultivar as well the temperature and light levels in which the plants are displayed. Site characteristics: (i) sun-light- full sun, part shade. (ii) Soil conditions -requires well-drained soil. (iii) Hardiness zones – 3 to 8. (iv) Special location-outdoor conditions, rock gardens, indoors as a houseplant. Plant trails: (i) life cycle – perennial. (ii) Easy-of-care- easy. (iii) Height – 0.25 – 0.3 feet. (iv) Spread – 0.25 -3 feet. (v) Bloom time: early spring. (vi) Flower color – orange, yellow, violet, white, blooms may be a single color, bicolor, or marked with striping and mottling. (vii) Foliage color- medium green. (viii) Foliage texture – fine. (ix) shape – spreading mass, upright, grass-like, individual plants are upright and grass-like, but spread to form large clumps. (x) shape in flower – flower stalks with upright spikes. Special characteristics: (i) non- aggressive – plants spread to form large clumps, but are not usually to nuisance. (ii) non-invasive. (iii) not native to north America-products of horticultural breeding. (iv) fragrant – blooms are sweetly fragrant. Special uses: naturalistic garden. Growing information: (i) how to plant- propagate by division or separation-divide in early fall. (ii) Maintenance and care – (i) plant the corms 2` below the surface of the ground. (ii) when forcing these bulbs, do not move them into a warm location until the flower buds show some color. (iii) moving them earlier may results in failure to flower.

Crocus angustifolius Waston^[6-19]

History

This is an old species dating back to the 16th century. It is also called ` Cloth of Gold crocus`. It was introduced in 1587 and described in early herbals including John Parkinson`s, Pardisi in sole (1629). In 1812 Thomas Jefferson was sent a dozen bulbs of this early flowering ` herald of spring` from Beonard McMahan, a Philadelphia nurseryman and author of the American Gardener`s Calandar (1806), who offered many rare an un-use plants McMahan described it is `Golden yellow, striped with brown outside`. It is also known as crocus susianus. Cloth of Gold can readily naturalize in flower beds, lawns and deciduous, woodlands. Once known as the `Turkey crocus`, small, early, vigorously multiplying charmer was grown in gardens by 1587 and appears in virtually every bulb catalog of 1800s. *Crocus angustifolius* was described by Richard Weston. The name is considered as validly published.

Synonym (s)

Crocus fluvus Fall ex Haw.
Crocus reticulatus var. *aureus* Trantv.
Crocus reticulatus var. *reflexus* Herb.

Crocus revolutus Haw.
Crocus roegnerianus K. Koch.
Crocus susianus Ker Gawl.
Crocus versicolor var. *caucasicus* Herb.

Scientific name: *Crocus susianus* Ker Gawl, *Crocus vernus* Mill.

Common name: Turkey crocus, Cloth of Gold crocus, Crocus.

English name: Cloth-of- Gold.

Latin name: *Crocus angustifolius*.

Herb: endemic, small, perennial, cormous. **Plant habit:** Herb/Forb. **Plant range:** Caucasus to Crimea. **Habit:** tufted. **Growth:** Garberville, California, Louisville, Kentucky, Taylosville, Kentucky, Beaver creek, Oregon salt Lake city, Utah. **Origin:** Ukraine, Krym, Transcaucasus. **Native climate:** cold winter warm dry summer. **Habitat:** critty, well drained soil in partial or full sun, with tolerate most soil type, open places and scrub land in mountains. **Growth:** 2-5 cm. **Spread:** 0.0 – 0.1 m. **Time of ultimate height:** 2-5 years. **Distribution:** Crimea, Ukraine, Armenia. **Altitude:** 200 – 1500 m asl. **Corm tunic:** coarsely, reticulate, obvious. **Leaves:** flowers blooming period is tall or slightly below, narrow grass-like with silver central stripe appear in late winter or early spring, scented, deciduous, simple, alternate, linear and sessile with entire margins and parallel venation, green. **Flowers:** on or amber, bright deep yellow, cup-shaped in March, strongly feathered with dark mahogany on the outside, scented. Out of the petals are striped purple or coffee, some form is filled in completely between there strips, these strips are not visible tube to completely dark. **Prophyll:** absent. **Filaments:** yellow, short, hairless. **Throat:** yellow, glabrous or papillose. **Anthers:** yellow, basi-fixed, extrose. **Pollen:** yellow. **Style:** 3 piece, yellow or orange, divided in 3 short parts from anterior and middle reaches of the hill anther level. **Capsule:** loculicide. **Seeds:** reddish brown, usually with distinct raphe and caruncle. $2n = 12$.

Phenology

March – April.

Characteristics

(i) Flowers are sterile. (ii) plant will not come from seeds. (iii) plant does not set seeds.

Crocus biflorus ssp. *tauri* (Maw) B. Mathew,^[20-28]

History

Crocus biflorus ssp. *tauri* was already described and the name validly publish by Georg Maw. Brain Frderck Mathew, however, who reclassified it into to-day valid botanical systematic in 1982.

Synonym

Crocus roopiae Woronow.

Crocus tauri Maw.

Habit: Herb/Forb. **Herb:** endemic, small, perennial, cormous. **Native:** Turkey, northern Iraq and north-west Iran. **Native climate:** cold winters with snow cover, warm dry summer. **Wild habitat:** rocky slopes sometimes in thin scrub. **Found;** higher mountains of south to north –east Turkey and north-west Iran. **Plant range:** Turkey to north-west Iran. **Growth:** 3-6 cm. **Distribution:** Turkey Armenia, N W Iran, northern Iraq/east and north-east Anatolia/Erzurum, kars, Bayburt, Erznean, Gumushane, Pain, Mersian, Kaysen, Malatya, Kahramanmares, Sivas, Hakkari. **Altitude:** 1300-3000 m asl. **Corm:** sub-globose, 1.5 – 2.0 mm in diameter, outer and inner tunics membranous. **Tunic:** split into segments of > 2-9 mm. so sub-splits. **Neck:** 6-12 mm long, bristly formed by elongated triangles. **Ring:** present, membranous, few, saw-toothed. **Cataphylls:** 3-5, silvery white. **Leaves:** 4-9 pieces, 1.5 – 3.5 mm wide, slightly erect, no hair, white stripe < 1/3 to 1/3 of leaf diameter, ribs underneath 2 on both sides of blade, deciduous, simple, alternate, linear and sessile with entire margins and parallel venation, in most it is shorter than the flowers in the green. **Flowers:** white or light blue tones, sometimes is completely dark blue tones, outer surface irregularly ribbed, some form of petals, the ends of dark blue stained while the bottom of the petals are dark blue shaded, as in all taurine group. On the inner side of the petals, but does mark a significant external surface vessels are seen as light. **Outer segments:** 20-24-30 mm long, 7-9-12 mm wide. **Inner segments:** 18-22-29 mm long, 6-8-10 mm wide. **Proportion:** of outer segments length/width 2.7. Inside all segments are deep blue to violet without marking. Outside of outer and inner segments deep blue to violet with in conspicuous marking at darker zone near the base. Flowers with no prominent stripe. **Throat:** deep yellow to orange, no hair. **Perianth tube:** white, violet-blue near segments. **Prophyll:** absent. **Bract and bracteole:** present, silvery. **Filament:** yellow broadened at base, median length 3 mm. **Connective:** colourless, mostly rather broad. **Anthers:** yellow. **Pollens:** yellow. **Style:** yellow to orange, 3 branched, filiform, thickened at top, mean length 6.2 mm. Style length according to stamen is 8 equal, 19 longer, 8 shorter. **Capsule:** loculicidal. 2n = 18.

Phenology

February – March.

Crocus chrysanthus^[29-93]**History**

In many ancient books, the exact locality from where the type specimen of *c. chrysanthus* came is unknown. It is one of the most common and the same time belongs to the most obscure crocus species. It is widely used in breeding and gardeners have raised many lovely cultivars-both as selection from the true wild species and

from hybridization with *c. biflorus*. It is not known just which forms of both species were used in hybridization. One place in the wild where they both grow to-gather and readily hybridise producing fertile progeny. Occasionally sterile hybrids can be rarely found almost every where both species meet, although *c. chrysanthus* usually prefers dry apots than the majority of *c. biflorus*.

In recent years investigations have been started and attempts made to separate new-forms with this complex from Turkish part of range, but the description of the plants are quite incomplete and the features used for separating the taxa can be found in the other distant populations. To separate different taxa used of features as leaf morphology the length proportions between filaments and anthers and shape of the basal lobes of the anthers as well as the shape of the corm tunics, basal rings. Other features used to separate the species of *c. chrysanthus* as follows: anthers–approximately the same lengths as the filaments with long, sharply pointed basal lobes. Stigmatic–branches are around the tips of the anthers or rise well above them. Corm–tunics are more or less coriaceous with 3-7 mm long, bristly neck formed by acute narrow segments. The basal rings are distinct, with densely spaced, sharp, 1 mm triangular teeth up to 1 mm long.

Note

Usually anthers in *c. chrysanthus* are entirely yellow or yellow with black tips of the basal lobes. Both variants can be found in *c. chrysanthus*, but there is no one region where all plants earlier included in *c. chrysanthus* have black anthers.

It is another reliable early crocus with many hybrid offspring in various color. Some of the best are *c. chrysanthus* `Blue Pearl`, *C. chrysanthus* `Snow Bunting (white)`, *c. chrysanthus* `Cream Beauty`, *c. chrysanthus* `Lady Killer` (white and deep purple), *c. chrysanthus* `Zwanenburg Bronze` (yellow flower with purplish shading on the outside of each petals) etc.

Crocus chrysanthus var. chrysanthus (Herbert) Herbert.

Scientific name: *Crocus chrysanthus*.

Common name: Yellow crocus.

Herb: small, perennial, cormous. **Native:** Balkans and Turkey. **Range:** SE Europe Turkey. **Habit:** tufted. **Native climate:** Mediterranean with montane in flueres. **Habitat:** open hill-side in short-truf coriferous woods, scrub. **Height:** 10 cm **spread:** 0 – 0.1 m **Time of ultimate height:** 2-5 years. **Distribution:** Albania and Greece east through Macedonia, Bulgaria and Turkey. **Altitude:** 2200 m asl. **Corm:** tunic hard, coriaceous with a 5.7 – 10 mm long neck formed by sharply pointed narrowly triangular tunic splits, 1-2 mm long, narrow, needle-like well separated teeth. **Cataphylls:** 3-5 (6), creamy yellow, upper ones some-times green or brown stained. **Leaves:** (2) 3-7(8) synanthous, shorter or longer

than flowers in flowering time green or grayish green, 0.5 -1.2 (-1.5) mm wide, margin and carina usually papillose. **Prophyll:** absent. **Bract and bracteole:** unequal, much narrower, membranous, white or brownish. **Flowers:** 1-4 (5), throat and perigon tube creamy white or yellow or yellowish orange, sometimes grayish, purplish, brownish, blue speckled, striped or suffused on exterior. **Throat:** glabrous or pilose. **Tepals:** ovovate or oblanceolate; obtuse, sub-acute. **Outer tepals:** (0.4) 0.5-1.3 x 1.7 – 3.5 cm. yellow, yellowish orange, sometimes purplish, brownish blue or blue speckled striped, veined striate or suffused from throat to upper parts. **Inner tepals:** 0.3 – 1.3 X 1.5 – 3.1 cm yellow, yellowish orange, sometimes pale purplish, brownish, blue speckled veined striate or lined from base, sometimes decreasingly to upper parts or suffused. **Filaments:** yellow, yellowish orange, (3.2-) 3.5 – 6.5 (-7.4) mm long, pubescent, puberulent, papillose or rarely glabrous. **Anthers:** (6.0 -) 7.0 – 15.0 mm long, wholly yellow, yellow with grayish, black longitudinal lines wholly grayish black, black or rarely with yellow spots, base fixed, extrose. **Pollens:** yellow. **Pollen grains:** spira – perturate. **Style:** divided into 3 fimbriate or expanded branches, yellow orange, orange- red, shorter than exceeding the anthers. **Capsule:** ellipsoid, sometimes purple-tinged carried above ground level at maturity. **Seeds:** brown or reddish –brown, ellipsoid, 1.4 – 2.4 x 2.0 – 5.1 mm diameter, usually with distinct raphe and carucle; testa colliculate-oculate, regular or irregular aculeate. 2n = 8,10,12,12+3B,14,16,20, 20+3B.

Phenology

February–April.

New classification

A new classification of the species is based mainly on the color of the flowers and anthers, type of pollen grains, seed surface ornamentation and chromosome number.

Crocus chrysanthus ssp. chrysanthus var. chrysanthus

Corm: 0.8-2.5 x 0.8 – 2.0 cm. **Leaves:** 0.5 – 1.0 (1.1) mm wide. **Flowers:** 1-4(5). **Throat and perigon:** creamy white or yellow. **Tepals:** yellow, sometimes yellow orange. **Outer tepals:** (0.4-) 0.5 – 1.3 x 1.8 – 3.5 cm. **Inner tepals:** (0.3) 0.4 – 1.2 x 1.5 – 3.2 cm. **Filament:** yellow or yellowish orange, (3.2-) 3.5 – 6.5 (-7.4) mm. **Anthers:** yellow, (6.0-) 7.0 – 13.5 mm. **Pollen grains:** spiraperturate. **Seeds:** reddish brown, (1.4-) 1.6 – 2.0 (-2.2) x (2.5-) 2.8 – 3.8 mm. **Testa:** colloculate – aculeate. 2n = 8.

Crocus chrysanthus ssp. chrysanthus var. bicoloraceus

Corm: 1.2 -1.6 x 1.2 – 1.6 cm. **Leaves:** 0.6 – 1.2 mm width. **Flower:** 1-3, throat, perigon tube. **Tepals:** yellow, grayish, purplish, brownish or blue speckled. Striped or suffused on exterior. **Outer tepals:** 0.3 – 0.4 x 2.0 – 2.8 cm. **Inner tepals:** 0.30 – 0.45 x 1.9 – 2.5 cm. **Filament:** yellow, yellowish – orange, 3.5 – 5.5 mm.

Anthers: yellow. **Testa:** colliculate, acute. **Pollen grains:** spiraperturate. 2n = 10.

Crocus chrysanthus ssp. chrysanthus var. atrovilaceus

Altitude: 1500 – 1800 m asl. **Corm:** 1.0 – 1.4 x 0.9 – 1.3 cm. **Leaves:** 0.6 – 1.1 (1.2) mm width. **Flowers:** 1-2, throat purplish, brownish or blue, perigon tube, yellowish – orange or purplish, brownish speckled or suffused on exterior. **Tepals:** often yellowish-orange, rarely yellow. **Outer tepals:** 0.25 – 0.45 x 1.7 – 2.1 cm. **Inner tepals:** 0.30-0.55 x 1.5 -1.9 cm. **Filaments:** yellow, yellowish-orange, 0.36 – 5.0 mm. **Anthers:** wholly yellow, 7.5 – 8.6 mm. **Seeds:** reddish – brown, 1.4 – 2.2 x 3.0 – 4.4 mm. **Testa:** irregular acute. **Pollen grains:** spiraperturate. 2n = 14.

Crocus chrysanthus ssp. punctatus

Altitude: 1185 m asl. **Corm:** 0.5 – 2.3 x 0.8–2.2 cm. **Leaves:** 0.6 – 1.2 (1.5) mm wide. **Flowers:** 1-4 (5), throat and perigon tube creamy white or yellow. **Tepals:** 0.4 – 1.1 x 1.5 – 3.0 cm. **Filaments:** yellow, yellowish – orange, 3-9 mm. **Anthers:** yellow with grayish black basal lobes, (6) 7 -11.9 mm. **Seeds:** brown, reddish brown, 1.7 – 2.4 x (2.8) 3 – 4.8 (5.1) mm. **Testa:** regular acute. **Pollen grains:** polygoidata. 2n = 12, 12+3B.

Crocus chrysanthus ssp. kesercioglu

Altitude: 1300 m asl. **Corm:** 1.2 – 1.5 x 1.1- 1.5 cm. **Leaves:** 0.7 – 1.0 (1.1) mm wide. **Flowers:** 1-2, throat and perigon tube yellow, yellowish-orange, purplish brownish or blue speckled or suffused on exterior. **Outer tepals:** edges yellow – orange, publish, brownish or blue speckled or suffused exterior, 0.4 – 0.5 x 2.1 – 2.3 cm. **Inner tepals:** edage yellowish-orange, sometimes purplish, brownish or blue speckled or suffused, 0.5 – 0.65 x 1.85 – 2.10 cm. **Filament:** yellowish-orange, orange, 4.6 – 7.8 mm. **Anthers:** grayish black, black or rarely with yellowish spot, 8.0 – 10.4 mm. **Seeds:** reddish-brown, 1.5 – 2.4 x 3.2 – 4.5 mm. **Testa:** colloculate-aculate. **Pollen grains:** polycolpate. 2n = 16.

Crocus chrysanthus ssp. sipyleus

Altitude: 1250 m asl. **Corm:** 1.4 – 2.5 x 0.8 – 2.1 cm. **Leaves:** 0.8 – 1.2 mm width. **Flower:** 1-4 (5), throat and perigon tube purplish, brownish or blue speckled, striped or rarely suffused on the exterior. **Outer tepals:** yellowish-orange, sometimes with 3-5 prominent lines or purplish, brownish or blue speckled, veined striate or rarely suffused on exterior, 0.4 – 0.8 x 1.8 – 3.2 cm. **Inner tepals:** generally pale purplish, brownish or blue veined striate or lined from base **sometimes decreasingly to upper parts, 0.4 – 0.8 x 1.6 – 2.9 cm.** **Filament :** yellow, yellowish-orange, orange, 4.4 – 6.7 mm. **Anthers:** yellow with grayish black longitudinal lines, 9.4 – 14.0 mm. **Capsule:** often purpletinged. **Seeds:** reddish brown, (1.5) 1.7 – 2.2 x (2.0) 3.0-4.9 mm. **Testa:** finely reticulate. **Pollen grains:** non aperature. 2n = 20, 20+3B.

Crocus chrysanthus var. *fuscotinctus***Botanical name:** *Crocus chrysanthus* var. *fuscotinctus*.**Common name:** Snow crocus, Cream Beauty snow crocus.**Cultivar name:** Fuscotinctus.**History**

Snow crocus are also known as Botanical crocus, there botanical name is *c. chrysanthus*. *Chrysanthus* was a saint from the third century. New Australia, crocus *Fuscotinctus* has been cultivated for over a century and is an absolute beauty. **Herb:** small, perennial, cormous. **Native:** montane region of the Balkans in southern Europe and western Asia. **Height:** 8-15 cm. **Width:** 7.6 – 12.7cm. **Native climate:** cool to Mediterranean. **Habit:** clump-forming. **Plant types:** bulb or corner tuber. **Hardiness:** hardy. **Wild habitat:** short grass's land, scrub and thin wood. It is a perennial that grows from strap-shaped, mid-green. **Corm:** tunic, membranous or coriaceous. **Leaves:** slender, sharp-shaped, mid-green, short, grass-like, 20–25cm., smaller than other crocuses, strengthening late winter sun, often paking up out of melting snow. **Flowers:** 1-4, small, creamy ivory to light yellow with a bluish of deeper yellow on the petals, fragrant. **Pollen:** vibrant orange. Once flowering ends, the foliage remain for several more weeks together nourishment for the bulb before dying by late spring. 2n = ?.

Phenology

February–March.

Characteristics

(i) hybrid (ii) *c. chrysanthus fuscotinctus* is another yellow snow crocus with brownish purple strips. The strips are more slender and not quite as pronounced as Gypsy Girl. Because the strips are on the outside of the petals, they are most visible in the bud stage or when closed up in the evening. When they open the inside of the *fuscotinctus* flower has sunny yellow petals and darker rings in the middle. The petite plants make a bright growing. (iii) once flowers cut, the foliage remains for several more weeks together nourishment for bulbs before dying by the late spring.

Crocus chrysanthus cultivars**History**

An intensive selection and hybridization programme was initiated by Jan Hoog (Van Tubergen Nursery) and E. A. Bowles. Several of their numerous selections are still available. During the first part of the 20th century the great English gardener E. A. Bowles, raise many good hybrids which he name after birds of the British country side 'Snow Bunting' was one of their and it does very well here at Lambley. As we would except good work done by Dutch blub growers too *C. zwaneburg Bronze* is good examples.

In latter years Janis Ruksans, whose book 'crocuses' is a most any bulb lover (Florilegium book shop stocks it.

www.florilegium.com au), has made some fine selections but sadly we have not got any of them yet.

Crocus chrysanthus cultivars are mixed bang of selections and hybrids from the wild parents *c. chrysanthus* and *c. biflorus*. Most are beautiful, robust, and easy garden plants, but few have dull or even murky color. *C. chrysanthus* is also another reliable early crocus with many name hybrid off-spring in various colors. Some of them are as follows:

Crocus chrysanthus 'Advance'

Crocus chrysanthus hybrid, through smaller than other crocuses, open up to, a sunny day and with their bright flowers announce spring is near 'Advance' is an early flowering hybrid and an excellent example. This is also an old variety from 1953, which has stood the test of time.

Botanical name: *Crocus chrysanthus* Advance.**Common name:** Snow crocus Advance, Golden crocus.

Herb: small, perennial, cormous. **Native:** Greece and Asia Minor. **Height:** 7 cm. **Spread:** 5 cm. **Growth:** 15 – 20 cm. **Foliage:** narrow green leaves that appear before and con-current with flowers, then die back after the flowers fade. **Flowers:** large, showy, cup-shaped with golden yellow petals are backed with contrasting violet blue reverses for terrific shoots of color before most other spring plants have been delightful expanding splashes of color. 2n = 8.

Phenology

January – March.

Characteristics (i) 'Advance' is an early flowering hybrid with several blooms suffused with violet on the outside of the petals and golden- yellow in-side. (ii) Flowers closed at night and open up in the morning, but usually remain closed on rainy/cloudy days.

Crocus chrysanthus 'Aubade'**Botanical name:** *Crocus* 'Aubade'.**Common name:** *Crocus* 'Aubade', *crocus chrysanthus* 'Aubada', Snow crocus Aubade.

Herb; small, perennial, cormous. **Habit:** compact, erect. **Full grown height:** 2.5 – 10 cm. **Width:** 2.5 – 10 cm. **Height:** 10 cm. **Spread:** over the year. **Corm:** compact, tufted, perennial. **Leaves:** linear, light except Filament & Anther -green, central strips, late winter and early spring. **Flowers:** white in spring and winter, goblet-shaped, mild fragrant. **Throat:** yellow. **Anthers:** orange – yellow. 2n = 10.

Phenology

February–March.

Characteristics

(i) the flowering time, mild fragrance produces, it attracts lots of early insects.(ii) very hardy, it will

naturalise and re-bloom for many years to come (iii) suitable for rockery garden.

Crocus chrysanthus `Ard Schonk`

Common name: Crocus, Snow crocus, Golden crocus.

Cultivar: Ard Schonk

Herb: herbaceous. **Height:** 8 cm. **Spread:** 8 cm. **Life cycle:** perennial. **Leaves:** green, longitudinal white stripe along the mid-rib deciduous. **Throat:** golden yellow. **Flowers:** petals fluted, with round tips, white, yellow center. The outside of the petals is white with A large blue basal and in-side petals have short green vein and center is brownish yellow. **Perianth tube:** purple. **Bloom color:** white/near white. $2n = 6$.

Phenology

February – March.

Characteristics

(i) thick smooth sating substances makes this pure white beauty a long lasting flower. (ii) like most other crocus, it is ideal for naturalizing and looks wonderful in large drifts. (iii) plant does not set seed, flowers are sterile or plants will not come true from seeds.

Crocus chrysanthus `Blue Pearl`

Botanical name: *Crocus chrysanthus* `Blue Pearl`

Common name: Snow crocus Blue Pearl, Snow crocus.

Cultivar name: Blue Pearl.

History

The Blue Pearl Dark is a long standing favorite, having first been hybridized in Holland in 1950. A soft and beautiful pale shade of the blue with creamy white foucher, the Blue Pearl is excellent for naturalizing, and is typically utilized as a prolific ground cover, in rock garden and along broders. Introduced by Greald H. Hogeman of the Netherlands in 1950. *Crocus chrysanthus* `Blue Pearl` has become on the standard garden crocuses by very widely distributed around the world.

Original species: Greece and Turkey. **Regional:** Chugiak, Alaskar Garberilla, California, Clifton, Cororedo Haw kinsviele, Georigin-Macy, Indiana. **Height:** 5-10 cm. **Spread:** 1 year. **Exposure:** Full or part sun. **Width:** 10 cm. **Distribution:** Around the world. **Growth:** Full growth. **Width:** 2.5 – 10 cm. **Stem:** early spring. **Foliage:** Herbaceous, smooth-textured. **Flowers:** Blue is pale and apalescent. Giving way to pure white at the edges. Inside the cup, a burst of deep-orange stigmas nestle deep in yellow conter, invisible until the flowers are full open. $2n = 8$.

Phenology

March–April.

Characteristics

(i) Blue Pearl is the color of the three wonderful sunny skies in late February, a light powdery blue with the

promise of deeper shades to come. (ii) `snow` crocus is favorite for mixing with yellow and for accenting the edges of grey stone walkways. (iii) Plant with Cream Beauty for a colorful late winter partnership or with later blooming. Dutch vernus types to excent the season several years. (iv) This crocus will multiply rapidly and nature easily in border-rock gardens and planters. (v) The lovely rariety has subtle beauty that is un-useful in the colorful genus and like the notion of alternating drifts of `Blue Pearl` with sky blue. Iris reticulate `harmony and snow drops` (vi) precautions: (a) parts of plant are poison in ingested. (b) hardling plant may cause skin irritation or allergic reaction.

Crocus chrysanthus `Cream Beauty`

Botanical name: *Crocus chrysanthus* `Cream Beauty`.

Common name: Crocus Cream Beauty, Snow crocus cream.

Habit: erect, clump-forming. **Height:** 7 cm. **Spread:** 5 cm. **Time of ultimate height:** 2-5 years. **Corms:** perennial `Cream Beauty` appearing in spring. **Leaves:** slender, strap-shaped, mid-green, grass-like. **Flowers:** cream, flushed yellow in spring. **Throat:** yellow, fragrant, brownish – grey towards base out-side. $2n = 8$.

Phenology

February – March.

Characteristics

(i) cream Beauty is a compact spring flowering crocus. The blooms are rich cream with golden throats and brownish green base. (ii) It is soft yellow crocus with bright orange contrasting stamen that provide a dash of electric sizzle. (iii) a species or snow crocus, Cream Beauty flowers two weeks before the giant varieties, for those who siply can't wait another moment that first splase of spring color. (iv) Blends beautiful with either gypsy Girl or Blue Pearl, both of which bloom.

Crocus chrysanthus `Dorothy`

Botanical Name: *Crocus chrysanthus* `Dorothy` or *Crocus* `Dorothy`

Common name: Hybrid crocus, spring crocus.

History(i) A welcome sight of late winter, this heirloom crocus open its cheerful flowers while the last remnants of snow still linger. Originating in the 20th century. It is one of many hybrids that trace their ancestry to *c. chrysanthus* and *c. biflorus*. (ii) Brighten up dull winter gardens and lawns with these early flowering crocuses, they have the outside. Dorothy is one of the first flowers to appear in the garden. Plant them any where and they will naturalise over the years when left undisturbed.

Native

hybrid origin. **Habit:** clump-forming. **Height:** 5.1–10 cm. **Width:** 5.1 – 10.2 cm. **Growth rate:** medium. **Description:** this diminutive herbaceous perennial grows from a small bulb-like storage orange known as corm. In

late winter or early spring, one to four golden yellow flowers arise on ankle-high, stalk-like floral tubes. Goblet-shaped when closed, the blossoms have brownish purple strips and stippling on the exteriors of their three outer segments. The stippling continues on the floral tube. In bright sun the blooms open wide to reveal the three inner segments and yellow-green eye, petals single. **Flowers:** cup-shaped, short, tubelike, grassy leaves emerge with the flowers, and wide-striped, showy. $2n = 10$.

Phenology

February–April.

Crocus chrysanthus 'E.P. Bowles'

Botanical name: *Crocus chrysanthus* 'E.P. Bowles'

Common name: *Crocus* 'E.P. Bowles', Snow crocus, Golden crocus, E.P. Bowles Snow crocus.

Habit: bushy. **Height:** 10 cm. **Spread:** 0.-0.1 m. **Time of ultimate height:** 1-2 years. **Native:** Spain, Portugal, Morocco, Italy, Asian Minor and China. **Life cycle:** perennial. **Width:** 15 cm. **Description:** E.P. Bowles has perennial corm with leaves in early spring. In late winter or early spring 1-4 fragrant pale yellow to orange yellow flowers arise on ankle-high, stalk like floral tubes. Goblet-shaped when closed, the blooms often have brownish-purple strips and stippling on the outside of their outer segments. In bright sun the bloom opens wide to reveal the three inner segments and yellow to orange anthers and stigmas. Short grassy, gray-green or medium-green leaves emerge with the flowers and go dormant by late spring. $2n = 10$.

Phenology

February – March.

Characteristics

(i) toxic. (ii) when purchase keep in mind the naturally smaller size of the species crocus tight because, you will want enough to form tight groups.

Crocus chrysanthus 'Elegance'

Botanical name: *Crocus chrysanthus* Elegance

Cultivar name: Elegance.

Category

Bulbous plant, ground covers, perennials. **Height:** 7.5 – 10.0 cm. **Width:** 5-7 cm. **Leaves:** medium grayish-green, basal and grass-like, lobed leaves with uneven silver edges. **Flowers:** bears up to 4, lightly fragrant, rounded brilliant yellow flowers with brown marking and bright yellow stamens. $2n = 12$.

Phenology

February – March.

Characteristics: (i) toxic (ii) when purchase, keep in mind the naturally smaller size of the species crocus tight

because you will want enough to form tight group. (iii) flowers live yellow to long lasting.

Crocus chrysanthus 'Gypsy Girl'

Botanical name: *Crocus chrysanthus* 'Gypsy girl'

Common name: Snow crocus Gypsy Girl, Golden crocus, snow crocus.

Cultivar name: Gipsy Girl.

History

Gypsy girl Golden crocus was developed by Gerald H. Hageman of the International Flower Bulb Center (International Bloembollen Centrum) in Hillegom. It is just about the strongest of the very early yellow, because if stormy weather comes along 'Kiss of spring' and Golden bunch' are in same year quite soon battered down, but 'Gypsy Girl' pops back up when this crocus has finished blooming all that remains is the crocus grass, there are, growing in the same vicinity, numerous die-back perennial which are returning to take advantage of the vacated space, keeping the location lively.

Gypsy Girl is an early blooming species or snow crocus that has earned her name with a snazzy combination of bright yellow and maroon feathered bloom. Plant this variety in masse for the most eye catching display. A great naturalizer and a fine partner for 'Cream Beauty' which bloom at the same time.

Habit: Herb/Forb. **Native:** hybrid origin: Balkans and Turkey and Britain. **Life cycle:** perennial. **Height:** 8-10 cm. **Spread:** 5 cm. **Description:** flowering a little earlier than average in the garden, with 3 or 4 flowers per corm. It has large golden-yellow flowers with purplish brown feathering on the out-side of the petals and slender, strap-shaped, mid-green. $2n = 8$.

Phenology

February – March

Crocus chrysanthus 'Jeannine'

Botanical name: *Crocus chrysanthus* Jeannine.

Common name: Dutch crocus, Giant crocus, Spring crocus, Crocus.

Cultivar name: Jeannine

Habit: Herb/Forb. **Height:** 15 cm. **Spacing:** 7-15 cm. **Life cycle:** perennial. **Regional grow:** Fort Jennings, Ohio Toledo, Ohio. **Full grown:** 1 year. **Jeannine:** bronzy interior with light yellow exterior brushed with plum purple coloring. **Leaves:** spring ephemeral. **Flower:** cup-shaped, soft yellow rounded petals, brushed bronze-purple on exterior with a bronze interior and striking deep orange stigma. Bloom color is gold (yellow-orange). $2n = 8$.

Phenology

February – March.

Characteristics

(i) plant does not set seed. (ii) flowers are sterile. (iii) plant will not come true from seeds. (iv) all parts of plant poisonous if ingested. (v) handling the plant may cause skin irritation reaction.

Crocus chrysanthus `Lady Killer`

Botanical name: *Crocus chrysanthus* `Lady Killer`

Common name: Snow crocus.

Cultivar name: Lady killer.

We have large clumps of this little beauty planted by mice several years ago, with its gorgeous lilac white flowers stained with purple at the base, this is strong growing dependable variety. **Habitat:** short grass and light woodland will tolerate most soil types. **Origin:** Greece, Turkey. **Height:** 7-10 cm. **Width:** 10 cm. **Spread:** 5 cm. **Corn:** ground cover, perennial, autumn, summer dormant. **Leaves:** medium grayish-green, basal grass-like. **Flowers:** erect. Long last, bears up to 4, slightly fragrant, rounder, white with dark purple marking and bright yellow stamens. $2n = 8$.

Phenology

February – March.

Characteristics

(i) Lady Killer is a form of *c. chrysanthus* with blue coloring possible coming from hybridization with *c. biflorus*. Both species grow naturally in tuft and under scrub with *c. chrysanthus* in Turkey and Balkans and *c. biflorus* all the way from Greece to Persia. (ii) This will not be distributed Netherland bulb company.

Crocus chrysanthus `Prins Claus`

Botanical name: *Crocus chrysanthus* `Prins Claus`

Common name: Snow crocus Prins Claus`

Cultivar name: Prins Claus

History

Crocus chrysanthus `prins Claus` was introduced by C.M. Berbee of Stopen, the Netherland in 1959. The cultivar name is His Royal Highness Prince Claus of the Netherlands (1926 – 2002), born Claus Von Amsberg, consort of Queen Beatrix of the House of Orange. Though a German aristocrat by birth, he was surprisingly humble of royalty and was noted during his lifetime for his support of arts and cultures.

Herb; small, perennial, cormous. **Height:** 10-15 cm. **Full growth width:** 2.5 – 10 cm. **Spread:** over the year. **Growth habit:** erect. **Time reach of full size:** 2-5 years. **Description:** a very unique colored multi-flowering crocus, each petal is white with a very distinctive deep purple marking on the interior. On sunny days Prins Claus opens so wide that the purple marking is almost invisible, appearing as if they were completely white and on over-cast days the blotches are so visible that it is just like two entirely different crocuses in garden, fragrance. With

its dark purple blotches and narrow grass-like foliage. $2n = 8$.

Phenology

February–March.

In dark Prins Claus will shoot through the snow in order to bloom. Each petal is white on the inside and also white on top portion of the outer petals, but a very deep navy purple on the bottom half or third. Some of them have a faint dusting of blue on the interior. With its dark purple blotches and narrow grass-like foliage, this is the perfect way to start the season. On sunny days `Prins Claus` is so wide open the purple blue blotches on the outside are invisible and it appears to be a strikingly bright all white crocus. On overcast days when petals remain partially closed, the blotches are fully visible. It's kind of like having location.

Crocus chrysanthus `Romance`

Botanical name: *Crocus chrysanthus* `Romance`

Common name: Snow crocus Romance

Cultivar name: Romance

Herb: small, perennial, cormous. **Habit:** dry soil, normal soil. **Regional:** Garberville, California, Laconia, New Hampshire. **Height:** 10-15 cm. **Spread:** over the year. **Leaves:** grassy, shiny, green with a longitudinal white line at the center. **Flowers:** cup-shaped, six petals, creamy yellow exterior and buff yellow interior, deeper color throat, fragrant. **Stamens:** yellow. $2n = 8$.

Phenology

February–March.

Characteristics: (i) hybrid. (ii) poisonous if ingested. (iii) handling plant may cause skin irritation or allergic reaction. (iv) snow crocus Romance is considered as one of the most romantic crocuses. It is one of the diminutive flowers that exemplifies the magic in nature, a tiny miracle that pushes through the snow to surprise and delight. (v) Romance is petty yellow, not the cream of cream Beauty, not the Goldilocks and Gypsy Girl. (vi) Snow crocuses naturalize well and group spread over time.

Crocus chrysanthus `Snow Bunting`

Botanical name: *Crocus chrysanthus* `Snow Bunting`

Cultivar name: Snow Bunting

History

The variety of *c. chrysanthus* is named for the bird *Plectrophenax nivalis*, a sallow that is not only largely white-feathered, but is prominent in northern areas even though the winter, lives as far north as island and green – land and throughout its range is a common sight hopping up on snow.

It is often described as pure white, but close inspection reveals color. The ivory petals have the faintest ice-blue

feathering on the outside dancing at the very base, plus of faded orange deep in center, together with its bright yellow-orange anthers.

Habit: erect. **Life cycle:** perennial. **Habitat:** open sites. **Height:** 10 cm. **Width:** 5 cm. **Time to reach full size:** 2-5 years. **Spread:** 10 cm. **Corm:** perennial. **Leaves:** dark green, narrow, silver strips running down their center, spring ephemeral, basal and grass-like. **Flowers:** erect, long-lasting, bears 4, lightly fragrance, rounded, white flowers with feathering light grayish blue marking and bright yellow stamens, orange stigmas. **Foliage:** deciduous. $2n = 8$.

Phenology

February – March.

Characteristics (i) Snow Bunting looks pure white a yellow center from distance but close to it is more ivory with a very faint purple bluish on the out-side of the petals. (ii) It has a delicate musky scent and bright-orange anthers. (iii) Like all crocuses chrysanthus it grows best in poor to moderately fertile soil which is well drained, while it will grow bloom in shade, it needs sun to open and prefers so be left undisturbed.

Crocus chrysanthus `Zwanenburg Bronze`

Botanical name: *Crocus chrysanthus* ` Zwanenburg Bronze`

Common name: Winter crocus, Snow crocus, Golden crocus, *Crocus*.

Other nameL: *Crocus* Zwanenburg Bronze

Cultivar name: Zwanenburg Bronze

History

This is solid performer originating from the famous Van tubergns Nursery in Holland, which has stood the last time.

Habit: erect. **Plant habit:** Habit/Forb. **Herb:** small, perennial, cormous. **Height:** 7cm. **Spread:** 5 cm. **Maturity period:** 1-3 years. **Rate of growth:** average. **Grow region:** Garberville, California, Wilkes Barre, Pennsylvania tach Claire, Wisconsin. **Corm:** perennial, appearing spring. **Leaves:** dark green, grass-like, spring epkernal, 7.5 cm long produce with flower. **Flowers:** fragrant, yellow with dark reddish brown outside, goblet-shaped, deciduous, four. $2n = 8$.

Phenology

January-March.

Characteristics

(i) hybrid. (ii) poisonous if ingested. (iii) handling plant may care skin irritation or allergic reaction.

Crocus dalmaticus (Vis) Herb.^[20,94-103]

Synonym (s)

Crocus dalmaticus f. *albiflorus* K. May.

Crocus reticulatus var. *dalmaticus* (Vis) Herb.

Common name: Species *crocus*, *Crocus*.

Naming: *Crocus dalmaticus* was described by Roberto de Visiani in 1842. The name is considered as validly published. **Habit:** Herb/Forb. **Herb:** endemic, small, perennial, cormous. **Native:** mountain regions of Croatia, Serbia, Montenegro places and northern Albania. **Native climate:** cool Mediterranean. **Wild habitat:** grassy places and scrub. Over lime-stone, Oak and beech trees are located in the area of space around them. **Grows:** along the eastern shore of the Adriatic sea. **Growth:** 5-8cm. **Height:** 10-12cm. **Distribution:** Albanic, Serbia, Montenegro, Bosnia and Herzgovning, Croatia, Kosovo. **Altitude:** 1500-2000m asl. **Corm:** papery, corm tunic reticulate (neeted) fibrous tunic. **Leaves :** 1-5, 1-2 mm (more then 3 cm expandable up to) the most such as hooks, fishing line around the bottom of the leaves has spine, deciduous, simple, alternate, linear and sessile with parallels venation, appearing with the flowers, Shorter than or equaling the flower, dark green. **Flowers:** 5-9 cm, white with very pale lilac are very rarely in dark purple lines on the out- side, spring, often with variously marked yellowish outer petals, inside of the petals it is shorter, solitary, cup-shaped. **Throat:** yellow, hairless. Flowers are white tube bottom and top side purple. **Prophyll:** absent. **Bract and bracteole:** 2 and clearly visible, sheathing the perianth tube, equal to 4-5 cm. and blooming flowers stood at the time. **Perianth tube:** 1.5 – 3.5 x 1.0 – 1.5 cm. **Anthers:** yellow, 9 – 13 mm. **Pollen:** yellow. **Filament:** 4-7 mm long. **Styles:** brighter or orange, 3 piece, each slightly expanded and fringed at the apex. **Capsule:** loculicidal. **Seeds:** many, sub-globose, with a distinct strophiole, reddish brown. $2n = 24$.

Phenology

February – March.

Characteristics

(i) *C. dalmaticus* grows along the eastern shore of the Adriatic sea. (ii) It has lilac-flowers with a yellow center and generally a buff-color exterior. (iii) Mathew reported finding one that was almost gold-color on the exterior. (iv) Bowles reported forms with exteriors that were `grayis lavender and rosyilac`. (v) It has wider leaves than wild plants and may be hybrid origin. (vi) Stocks of it often show virus sysmptoms with the flowers spotted and streaked on the exterior.

Crocus etruscus Parl.^[19, 104-115]

Common name: Etruscus *crocus*, Etruscan *crocus*, Species *crocus*, *Crocus*.

History

Range description – This Italian endemic is found in central-southern Tuscany in the province of Grosseto, Livorns, Pisa and Siena. The major localities where the species found are Monte Calvi (Livorno). Monte Leoni (Grosseto), Monti Amiata (Grosseto) and Massa

Marittima (Grosseto). This species occurs for Isola d'Elba (Tuscany) and Emilia - Romagna are wrong and refer to *c. livensis*. This was introduced in 1877.

Herb: endemic, small, perennial, cormous. **Habit:** tufted. **Plant range:** N & NW Italy. **Native:** Italy (mainland). **Found:** central-southern Tuscany. **Extent:** occurrence of 1,892 km² and an area of occupancy of 120 km². **Original:** Bastia, Corsica 1200 m asl. **Habitat:** low-elevation mixed forests are found in places in between bushes and open area. **Height:** 10 cm. **Width:** 5 cm. **Growing:** 8 cm tall. **Major threats:** the plant is potentially threatened by habitat degeneration and reduction and by predation by wild boar (*sus scrofa*). Small -scale wood plantation may threaten this plant in the further. **Spread:** 10 cm. **Distribution:** Italy/N and NW Italy, Corsica. **Altitude:** 300 – 600 m asl. **Corm:** tunic coarsely reticulate. **Leaves:** 3-4, flowering period is shorter than flower, varying width, dark green, white band, produce after flower, 20- 25 cm long. **Flower:** 8-10 cm high, cup-shaped, arranged solitary, light or dark mauve, cream or tan on the outside, has short lines at the bottom only. The inner face of the flowers are much lighter. **Tube:** slightly darker color. In some forms of the flower tube it is very dark. **Throat:** yellow, very small. **Bracts:** absent. **Anthers:** yellow. **Filament:** pale yellow. **Pollen:** yellow. **Style:** orange, stigma short three piece, the end is at the top level and down the frilly anthers. **Capsule:** loculicidal, emerge towards the end of the growing season and the leaves die away. **Seeds:** different sizes and shapes. $2n = 8$.

Phenology

February -March.

Crocus etruscus `Zwanenburg`^[116-123]

Botanical name: *Crocus etruscus* `Zwanenburg`

Common name: *Crocus etruscus* zwanenburg

Cultivar name: Zwanenburg crocus

History: It is a strain selected for occasional color by Thomas Hoog and named *crocus etruscus* `Zwanenburg` after the Zwanenburg Nursery at Haarlem, where many crocus varieties originated, *crocus etruscus* zwanenburg is also known as Tuscan crocus as it is a native crocus from northern Italy.

Herb: deciduous, endemic, small, perennial, cormous. **Native:** Italy. **Habit:** erect. **Plant habit:** Herb/Forb. **Native climate:** cool to Mediterranean. **Grow regional:** Garberville, California, New found land and Labrador. **Grow:** 8 cm and 4 cm in width. **Spread:** 0.0-0.1 m. **Time of ultimate height:** 1-3 years. **Habitat:** low-elevation mixed forests are found in places in between bushes and open areas. **Distribution:** Italy. **Altitude:** 300 -600 m asl. **Corm:** fibrous (reticulate) tunic. **Leaves:** slender, green, deciduous, grass-like with narrow medium silvery stripe, flowers appearing before the leaves. **Flowers:** 1-2, 10 cm tall, 6 petals, lilac-blue, the outsider washed or biscuit-brown with faint purple veining, open and closed on sunny days, lilac in spring

and winter, fragrant. **Throat:** pale yellow. **Anthers:** bright orange. **Style:** orange, stigma short 3 pieces, end at the top level and down the frilly anthers. **Capsule:** large enough have a decorative value of their own. They are like small matted green nuts that burst open into 3 compartments, revealing many lentil sized seeds already having the appearance of bulb. $2n=?$

Phenology

February – March.

Characteristics

(i) *crocus etruscus* zwanenburg has relatively large (for the species) lilac blue flowers. (ii) A pure delight is early spring that if left undisturbed, will multiply year after year.

Crocus flavus hybrid species^[124-132]

The origin of the two common cultivars of crocus, *c. stellaris* ($2n=2x=10$) and *c. Golden yellow* ($2n = 3x = 14$) was investigated by fluorocant in situ hybridization using both to a genomic DNA and cloned DNA sequence as probes. The color differentiation between the chromosome after genomic in situ hybridization supports the proposals of a hybrid origin of the cultivars and shows that they have the same parental genus originating from *c. flavus* origin and six chromosomes of *c. augustifolius* origin. C. `Golden yellow` has eight chromosomes *c. flavus* origin and six chromosomes of *c. augustifolius* origin.

Crocus sterraris Howorth

Synonym: *Crocus lagenflorus* var. *stellaris* (Haw) Herb.

Scientific name: *Crocus x stellaris* Haw

Common name: *Crocus stellaris*, Dutch crocus, Spring crocus, Crocus.

English name: Yellow crocus, Crocus, Yellow, Crocus stellaris (x) [hybrid].

Badly forms/ Unverified names

Crocus x stellaris, Saffron melyn.

History

A plant of uncertain origin cultivated for over two hybrid years. Probably a sterile hybrid between *c. flavus* ssp. *flavus* and *c. augustifolius*. A rare escape from cultivation or merely a throw-out or garden relic. Probably locally more or less established. This hybrid probably is the most wide spread yellow flowered crocus in Belgium, in cultivation as well as in the wild.

Herb: small, perennial, cormous. **Source:** Artsnavnebasen. **Digonic:** feedore. **Plant habit:** Herb/Forb. **Habit:** tufted. **Ultimate height:** 10 cm. **Spread:** 0-0.1 m. **Time of ultimate height:** 2-5 years. **Habitat:** Introduced- naturalize; much grown in gardens, naturalized as for *crocus vernus*. **Distribution:** present in Norway ISO; No **Corm tunic:** coriaceous with parallel veins and no splitting at the base, reticulated upwards, uniting into a few teeth. **Leaves:** mostly 1-4 mm wide, dark green linear, with a white central stripe. The cross

section of the leaf is not flat but with downward (revolute) curving edges. **Flowers:** bright golden yellow with bold purple-black stripes, lighter yellow than in *c. angustifolicus*, out side with three to five feathered, brown lines. Petals joined together and pure yellow on the inside but with purplish stripes (that extend from the upper part of the flower stalk) on the outside. **Segments:** 20-35 mm long., elliptic, subacute, giving the flower an elongate appearance. **Perianth:** bright yellow more or less uniformly or with brownish suffusion or stripes outside on tube. **Throat:** yellow, glabrous or pubescent. **Filaments:** small hairs present. **Anthers:** three, hairy, yellow, basifixed, extrose. **Pollen:** yellow. **Style:** orange or yellow, three pieces, divided into three parts from anterior and middle reaches to the hill anther level. **Capsule:** loculicide. **Seeds:** usually reddish-brown in different shapes. $2n = 2x = 10$.

Phenology

Late winter and early spring.

Characteristics

(i) 6 tepals, 3 stamens and 3 style indicate fairly typical monocotyledon. (ii) plant appears hairless throughout but there are very small hair of the filament. (iii) easy to grow but not widely available commercially.

Crocus flavus Weston, R.^[133-143]

Synonym(s)

Crocus flavus ssp *flavus*.

Crocus aureus

Crocus floribundus

Crocus lacteus

Crocus layeniflorus

Crocus lateus

Crocus maesiacus

Crocus penicillatus

Crocus sulphureul

Common name: Dutch yellow crocus, Yellow crocus.

History

Gull crocus (*Crocus flavus*) is an iris plant species described by Richard Weston (1771). In the Swedish detabase Dyntarea used instead named *crocus x stellaris*. *C. flavus* (Dutch yellow crocus species the includes subspecies. (i) *Crocus vernus* ssp *dissectus* T. Baytop & Mathew – western Turkey. (ii) *c. flavus* ssp. Weston – Greece, Turkey, Balkans, Naturalized in Utah and (iii) *C. flavus* ssp. *sarichinarensis* Ruksans- Turkey. The Latin species specific epithet *flavus* means 'Pure yellow'.

Herb: small, perennial, cormous. **Origin:** Greece, Serbia, Bulgaria, Romania, Turkey. **Plant range:** Balkan to Turkey. **Native :** Greece, former Yugoslavia, Bulgaria, Romania and NW Turkey, but has been cultivated in U.K. for over 400 years. **Distribution:** Balkan, Greece, Turkey/Marmara Region/ Edirne, Canakkole Tekirdag, kirkli, Istanbul, Kocaeli, Yalova, Bursa, Eskisehir. **Habitat:** light woods in the forest edge,

mid-way between the canopy and shrub cultivation land areas. **Height:** 10 cm. **Propagation material:** Seeds, Bulbs. **Habit:** tufted. **Altitude:** 0-1200 m asl. **Corm:** tunics, membranous, splitting into vertical fibrous and lacking distance horizontal rings at the base deep russet color. They have the unusual characteristic of being elongated to form a tube through which shoots emerge and this persists for several season if not disturbed. **Leaves:** 4-8, usually 5 in number of each about 10-23 x 1-4 mm size, erect, synanthous, green with distinct white's stripe median, pubescent. **Segments:** dark yellow or orange, 1-3.5 x 0.5 – 1.5 cm in size, oblanceolate, obtuse to sub- acute, giving the flower a some what pointed appearance. **Flowers;** 1 or 2, large, bright light or dark yellow, out side mostly without any lines or suffusion at the base. Flowers of the throat and flowers all around, including some forms of the flowers tubes, tube light grey color although one or coffee can stain color. Generally corresponds to the smaller forms were obserbed in certain populations to be large- size type (B is very nice rounded shape). **Flower tube:** yellow to pale yellow. **Filament:** yellow or orange. **Throat:** yellow. **Anthers:** yellow., 8-12 mm long. **Pollen:** yellow. **Style:** yellow or pale orange, shorter than anther, 2-5 mm in size, divided into 3, usually expanded branches. **Capsule:** loculidal. **Seeds:** large, recognizable rich russet. $2n = 12$.

Phenology

February–April.

Crocus gargaricus Herb^[101, 144-153]

Synonym (s)

Crocus aureus E.D. clark (Illegitimate)

Crocus gargaricus var. *citrinus* Herb

Crocus gargaricus var. *panchrysus* Herb

Crocus gargaricus ssp. *gargaricus* Herbar

Common name: species crocus, Crocus.

History

C. gargaricus grows only Kaz Dag In turkey. The rarity in cultivation is undoubtedly down to the fact that it has only been recently recognized as well as this limited wild range. It grows in mountain meadows above the ancient city of Bursa, bears bright yellow-orange flower in spring and quickly bulds into climps by under-ground stolen; is not so dependent on a dry summer rest as are some of the other Asiatic crocuses. It increase is only by offsets and seeds. The name of *crocus gargaricus* was described by William Herbert. The name is considered as validly published.

Plant habit: Herb/Forb. **Herb:** endemic, small, perennial, cormous. **Origin:** NW Turkey. **Native climate:** continental montane, cold snowy winter, cool moist summer. **Wild habitat:** damp grass-lands, thin woodland, alpine place where pet is located. **Plant height:** 20 cm. **Spread:** 1-3 m. as garden or park escape. **Growth habit:** clump. **Growth height:** 2-4 cm.

Element: Euro-siberian. **Distribution:** Turkey-KB Anatolia. **General:** Balikesir (Ida mountains), Mugla (Goktepe), Bursa, Istanbul. **Altitude:** 1300–2200 m asl. **Corm:** coarsely, reticulate-fibrous, tunic rings absent, less than 1 cm across. **Leaves:** 3-4, deciduous, simple, alternate, linear, sessile, parallel venation, pale silvery green central stripe flowering period does not appear (but now begin to rise or lower the flowering period). **Prophyll:** absent. **Flowers:** 3-4 cm across, 4-7 cm tall or more, solitary, cup-shaped, bright yellow shining like the outer surface of almost plowed varnish. **Perianth tube:** obtuse or sub-acute, hairless. **Throat:** yellow, glabrous. **Anther:** yellow. **Pollen:** yellow. **Style:** bright yellow, divided into three short parts from middle level of the anthers, branches number of styles -3, longer or equal than stamens. **Fruit capsule:** loculicidal, 15–30 mm long, above ground level. **Seeds:** number, brownish, globular shaped. $2n = 30$.

Phenology

March – April.

Characteristics

(i) Gargaricus plant does not produced stolon meaning that increase in only by offsets and seeds. (ii) Ornamental interest. (iii) Use on borders.

Crocus herbertii Mathew, B. [15, 93, 154–164]

Synonym (s)

Crocus gargaricus Herb ssp. *herbertii* Mathew
Crocus thirkeanus K. Koch.

Common name: Species *crocus*, *Crocus*.

History

Crocus herbertii is an iris plant species described by Karl Heinrich Koch in 1848 by given name of *crocus thirkeanus*. *Crocus herbertii* is a species that came from KazDag mountain of western Turkey naturally small corms, however, are able to give a single large flower of striking color in early spring. No genus does yellow better than *crocus*.

Habit: Herb/Forb. **Herb;** endemic, small, perennial, cormous. **Origin:** west Turkey. **Native climate:** continental montane, cold snowy, cool summer. **Wild habitat:** damp grass-lands and woodlands. **Height:** 15 cm. **Spread:** 7-15 cm. **Growth habit:** clump. **Found:** High altitude plant found only on Ula Dag and 2-3 adjacent mountains in Turkey. Where it flowers at the edge of melting snow in spring. **Distribution:** NW Turkey. **Altitude:** 1350–2250 m asl. **Corm:** tunic fibrous, reticulated only at apex, small, stoloniferous, slowly occupies free area, but never becomes as weed, ring absent. **Leaves:** 3-4, deciduous, variegated, smooth-textured, pale silvery green central stripe, width of the white stripe 1/3 of the leaf diameter, green, 2 mm wide, flowering period just developing. **Prophyll:** absent. **Flowers:** little smaller, solitary, cup-shaped, very deep yellow with dark orange tint, shining like the outer

surface of almost plowed varnish. **Perianth tube:** obtuse or sub-acute, hairless. **Throat:** yellow, glabrous. **Filament:** yellow. **Anthers:** yellow. **Pollen:** yellow, pollen diameter mean (μm) – 82.1, standard deviation ± 4.6 , variation (μm)– 73-91, spinulat height (μm) – (1)– 1.02 – (1.25), spinulate number per 100 (μm)² – (37) – 42 – (55), sexine thickness (μm) except of spinules – (1) – 1.22 – (1.5). **Style:** bright yellow, divided into three short parts from middle level of the anthers, branches number of styles -3, longer or equal than stamens. **Fruit capsule:** 15-30 mm long, above ground level, loculicidal. **Seeds:** globular shaped, numbers, brownish. $2n = 30$.

Phenology

February – March.

Characteristics

(i) normally small corms are able to give a single large flower of striking color in early spring. (ii) *crocus herbertii* is now only *herbertii* due to different corm tunics. (iii) native to regions of US include the eastern mid-west interior North-east, Mid- Atlantic and upper south.

Crocus korolkowii `Kiss Spring`^[165-172]

Botanical name: *Crocus korolkowii* `Kiss spring`

Cultivar name: Kiss of spring.

Habit: Herb/Forb. **Native:** dry mountains central Asia in the `stan` countries, sub-alpine areas of Kosova, Afghanistan, N. Pakistan, Tadjikistan, Uzbekistan. `Stan` mean `the country or place where one dwells`. Thus Afghanistan is O the place where the Afghans dwell. **Herb:** small, perennial, cormous. **Native climate:** cold winter with snow, dry summer. **Wild habitat:** open rocky and grassy places. **Origin:** Pakistan. **Height:** 10 – 20 cm. **Spread;** 0.5 cm. **Growth habit:** Rosette. **Distribution:** Pakistan (chitral), NE Afghanistan, Uzbekistan, Tadjikistan, Russia (north wands to kara taumountains. **Corm:** 1-2 cm in diameter, sub-globose, inner tunics membranous. **Cataphylls:** 3-5, white sometimes with brownish, greenish or purples veins at the tip. **Leaves;** synanthous, (7-) 10-12, 0.1-0.25 cm, mid green glabrous or sub-scabrid at the margins. **Inflorescence:** 1-3-5 flowered cyme. **Bract and bracteole:** exerted from the cataphylls, c. 4-10 cm long. **Flowers:** fragrant, bright yellow, 5-7 cm long, vernal. **Perianth tube:** (3-) 5-10 (-13) cm, yellow, purple or bronze. **Segments:** 6, in two whorls, sub-equal or inner slightly shorter and less acute, 2-3.5 x 0.6 -1.2 cm, elliptic to oblanceolate, sub – acute to obtuse stamens 3. **Filaments:** 4-6 mm long, glabrous or some what pubescent at the base **Anthers:** 8-13 mm long, yellow. **Pollen;** yellow. **Style:** as long as or longer than the upper tip of the anthers, divided into 3 elongate stigmatic arms, terminating into expanded papillose stigmas, **Capsule;** 1.2-2.1 cm long, cylindrical, carried at in just below the ground of maturity. **Seeds:** 0.3 mm long, sub-

globose or ellipsoid or trigonous, reddish brown. $2n = 20$.

Phenology

February – March

Characteristics: (i) an important oriental plant in cold regions, grow in sunny rock garden. (ii) the flower color variation with the ceternal color varying from nearly yellow to biscuits – colored through all degree of grayish, blackish-brown, bronze or purplish to entirely deep bronze is probably the main virtue. (iii) this plant is toxic. (iv) this early flower (February) is 10 -20 cm high. (v) plant does not set seed, flowers are sterile or plants will not come true from seed.

Crocus korolkowii regel ex Maw^[116,173-180]

Common name: Korolkov's crocus, Calandine crocus.

History

This species is native to Pakistan, Afghanistan, Uzbekistan, Tadjikistan and northward through Russia to the Kara Tau mountains. It is named of General N.J. Korolkov who collected plant in central Asia in the 1870s for the botanical garden in St. Petersburg. Korokov also has an iris, arum, honeysuckle and a few other plants named for him. Sometimes called the celandine crocus, because it is the same color as lesser celandine and the celandine poppy. The name celandine has come to mean 'yellow', but the word is actuality alludes to a shallow, and very early bloomers were so-named because they were first to flower in the year, as shallows are among the first birds to return before winter has even ended. The reason so many of the earliest-blooming crocuses plus butter-cup family celandines are bright yellow is because they are competing for the same early-season pollinators, which are most attracted to yellow. **Herb:** small, perennial, cormous. **Native climate:** cold with snow, dry summer. **Wild habitat:** open rocky and grassy place. **Habit :** clump-forming. **Height:** 7.6 – 15.2 cm. **Width;** 5.1 – 10.2 cm. **Growth rate:** medium. **Plant:** 10-20 cm tall. **Distribution:** central Asia/ Uzbekistan, northern Tajikistan, eastern Afghanistan, northern Pakistan. **Altitude:** 1200 – 3150 m asl. **Corm:** globose, 2 cm diameter, tunic membranous divided into a lot of parallel fiber in the bottom. **Leaves :** 5-15, very narrow, 1-2 mm wide, develop at flowering time, level of flowers or blooming period is still a little long, green. **Flowers :** 5-7 cm high, shiny yellow, abundant flowering i.e. 15 – 20 per corm, outside of the petals are changing color or light spotted in chocolate or coffee, late winter to spring. **Throat :** chocolate color. **Anthers :** yellow. **Style:** light yellow or yellow, anther level or above.

Phenology

wild- January–February

St. Petersburg - march – April.

Crocus luteus `Golden Yellow`^[181-194]

Synonym (s)

Crocus x stellaris `Golden Yellow`

Crocus `Dutch Yellow`

Crocus `Mammoth Yellow`

Crocus `Golden Mammoth`

Crocus `Golden Yellow`

Crocus `Large Yellow`

Crocus `Yellow Mammoth`

Crocus x Luteur `Golden Yellow`

Botanical name: *Crocus venus* Golden Yellow, *Crocus x luteus* `Golden Yellow`

English name: Golden yellow

Latin name: *Crocus x Luteur*

Common name: Dutch crocus golden Yellow, *Crocus* `Large yellow`, *Crocus* golden Yellow.

Cultivars name: Aka Golden Yellow, Dutch yellow, golden Mammoth, Large Yellow, Mammoth yellow.

History

It is also called crocus stellaris or crocus x luteur stellaris. One of the most prolific and desirable forms of crocus cultivation is crocus `Golden Yellow`. The names `Dutch yellow` Maw 1886. Large yellow, Yellow Giant, Yellow Mommoth and Grote Gele scheepen 1981. Bowles (1924,1952) suggested that reo's 1665 discession of `Greatest yellow crocus` may be an early reference of this cultivar. It is one of the better species for naturalizing into Garens: Gotta have it! This is the most popular crocus of the part 300 years a vibrant orange-yellow, like molten sun.

Plant habit: Herb/Forb. **Herb:** small, perennial, cormous, endemic. **Native:** Levant, hybrid origin, Europe, northern Africa, western Asia. **Habit:** tufted, erect. **Height:** 10–15 cm. **Spread:** 5–7 cm, spread rapidly and form cluster of golden blooms year after years. **Time of ultimate height:** 2-4 years. **Habitat:** gritty, well drains soil in partial of full sun, well tolerate moist soil types. **Grow:** (i) **cultivation** – grow in a gritty, poor to moderately fertile soil. (ii) **Propagation** – remove cormlets when dormant. **Rate of growth:** average. **Corm:** tunic membranous in the upper part, upwards continuing into a shorter or longer tube or a few points, and almost parallel fibres to-wards the base, each bulb produce up to 5 flowers. **Leaves:** slender, strap-shaped, mid-green, 1-4 mm wide, with white central stripe. **Flowers:** large, bright golden, with slightly dark striped at the base. Vigorous, clump-forming, grows to upper 0.5 ft high, orange, yellow in spring, outside with 1-3 (-5) short, grayish lines at the base. **Segments:** 35 – 45 mm long, obovate, obtuse, giving the flower a rounded appearance. **Perianth:** yellow, more or less uniformly or with whitish suffusion or stripes out-side on tube. **Throat:** yellow, glabrous or pubescent. **Filaments:** small hairs present. **Anthers:** basifixed, extrose, three, yellow. **Pollen:** yellow. **Style:** orange or yellow, 3 pieces, divided into three parts from anterior and middle reaches to the hill anther level. **Capsule:** loculicide. **Seeds:** usually reddish brown, different shaped. $2n=14$. **Phenology:** February – March.

Characteristics: (i) c. 'Golden yellow' is larger in all parts e.g. corms and flowers than c. flavus, c. angustifolius and c. stellaris. (ii) plant of marit, showy. (iii) golden uses – Banks and slopes, Beds, and Borders, Patio and containers. (iv) bloom in early spring shortly after snow drops (Gaelanthus), 'Golden yellow' is larger flowered bright yellow cultivar. (v) the browning foliage indicates the corms are well fed and ready for their summer rest.

Crocus malyi Vis.^[195–209]

Common name: malyi crocus.

History

Crocus malyi Vis was found near the village of Tomici (1759) at the Park's fringe. For a long time the distribution area was the object of frequent contradictions, confusion and mistaken quotes. These confusions and mistakes have led to the neglect of an important steno-endemic species, even in the most recent Croatian floristic literature. *C. malyi* is endemic to Croatia. Croatia is sovereign state at the cross-roads of central Europe, southeast Europe and the Mediterranean. Its capital city is Zagreb, which forms one of the country's primary sub-division, along with its twenty countries. More details on these issues can be found in Pulevic (1983). The data cited there lead to the conclusion that all record of *c. malyi* in Baka Kotorska area in Montenegro are erroneous and that this species has been found only on Mount Velebit a number of localities, and should therefore be considered an endemic plant of Velebit. *Crocus malyi* is hybrid, no specified origin, cultivated material and from early this species was included in versicolor series.

Herb: endemic, small, perennial, cormous. **Native:** Croatia and Bosnia-Herzegovina. **Found:** Yugoslavia. **Native climate:** Mediterranean. **Wild habitat:** calcareous formations found in opening in the short grassy areas and pine forests around them. **Habit:** tufted. **Height:** 5-8 cm. **Spread:** 10 cm. **Time of ultimate height:** 2-5 years. **Plant range:** Croatia. **Grows:** grassy rocky places in western Balkans. **Distribution:** west Croatia, Velebit mountains. **Altitude:** 300 – 1000 m asl. **Corm:** tunic finely fibres, the fibres more or less parallel or obscurely reticulate at the apex of the corm. **Leaves:** 3-5, 15 – 25 mm wide, present at anthesis, deciduous, simple, alternate, linear and sessile with entire margins and parallel venation, flowering period is longer than the leaves or level of flowers. **Flowers:** 1-2, solitary white cup-shaped, some tinged with blue or brown at the base, externally white and yellow in spring. Sometimes it is seen as a notch in the outer tips of the petals. **Throat:** deep yellow, pubescent. **Prophyll:** present. **Bract and bracteole:** present, well exserted from the cataphyll, membranous, white, very unequal, the bracteole much narrower than bract, more or less linear. **Perianth tube:** 4-9 cm, white sometimes suffused yellow, brown or purple. **Segments:** 2-4 x 0.8-1.9 cm, oblanceolate, sub-acute or obtuse. **Anthers:** yellow. **Filaments:** light

yellow. **Style:** yellow to deep orange, exceeding the stamens, divided into 3 branches, each branch expanded and after shortly lobed at the apex. **Fruit:** loculicidal. **Seeds:** unknown. $2n = 24$.

Phenology

March – April.

Characteristics: (i) there are no close relatives, according to the genetic family tree. Even though morphologically resemble certain *c. vernus* form is very to separate from the group that has a yellow throat with flower. Honestly, this not see any other kind of similar to this species. (ii) no need for any summer or winter protection. Summer is a very tolerant species against the rain. (iii) culture is species that grow very easy and common.

Crocus atticus 'Firefly' (Boiss & Orph) Mathew. B.^[15, 20, 210–219]

Synonym (s)

Crocus sieberii J. Gay var. *crocus atticus* (Boiss & Orph) Orph
Crocus sieberii 'Firefly'

Common name: *Crocus* Firefly, Sieber's crocus, snow crocus.

Botanical name: *Crocus sieberii* ssp. *atticus*.

History

It is believed to have originated from the type locality at Pendlikon near Athens where the Ancients queried the stone of the Parthenon hill viewer are plant. The classification of saffron that was challenged and remains cloudy until, to-day. Originally described as separate species *crocus atticus* and later included in type *crocus sieberii* as sub-species of the recent data obtained by methods chemotaxonomy, however indicate it is grouped in the other sub-species of *c. sieberii*. There after reconsider the case of the egg, to determine it is a distinct species. *Crocus atticus* 'firefly' was developed by M. Thoolen of Overveen, the Netherlands. It is the single most popular crocus of its species. *Crocus sieberii* sub-species *atticus* comes from the Attica region of Greece. In Greece, *crocus sieberii* ssp. *atticus* popular as the name of Plant hunter. Grows in low altitudes in Greece, primarily on slopes and open woodlands around Athens specific epithet honors Franz Wilhelm Sieber (1789 – 1844) of Progeve.

Herb: small, perennial, cormous. **Origin:** Greece, S. Balkans. **Native:** Europe, southern Europe, Mediterranean, northern Africa, western Asia. **Native climate:** Mediterranean. **Wild habitat:** stony slopes and open conifer found in rocky areas and around forest opening. **Endemic:** Greece. **Growing regions:** Little Rock, Arkansas, Garberville, California, Denver, Colorado, Clinton, Connecticut, Blissfield, Michigan. **Growing:** 7-10 cm. **Height:** 5.1 – 10.2 cm. **Width:** 5.1 – 7.6 cm. **Time of ultimate height:** 1-2 years.

Distribution: Greece/Attica/ Evja, Andros Island. **Growth habit:** clumforming. **Altitude:** 400 – 1350 m asl. **Corm:** tunic coarsely fibrous, reticulate. **Leaves:** 3-6 narrow, dark green, 7.5 cm long, 2-6 mm width, each leave being adornet with a very thin stripe, width of the stripe < 1/3 to 1/3 of leaf-diameter, linear, alternate, decidunes, produced with flower, goblet –shaped. **Flower :** light or dark purple, yellow or light yellow featherless, neck, born single, short, erect- like flower tubes, with six-petaled, outer petals white, inner petals wineral-violet, yellow base. **Throat:** golden or prominent yellow, orange yellow in bright sun, born on sturdy stems. **Prophyll:** absent. **Bract and bracteole:** same size, membranous. **Anthers:** yellow. **Pollen:** yellow. **Filament:** yellow. **Style:** yellow, orange to red, divided into 3 branches from the line anther short fringed at the tips. **Capsule:** ellipsoid, each chamber 5-7 mm wide. **Seeds :** brownish, different sizes, many. $2n = 22$.

Phenology

February – March.

Characteristics: (i) *C. atticus* grows in low altitude in the Greece, primarily on slopes and open woodland around Anthens. (ii) performer- Firefly will quickly increase over time providing attractive splashes of color in the garden. (iii) when leaves dry off, until late autumn it rests in the shade of a drift of *sulviaremorosa*. (iv) once flowering ends, the foliage remain for several weeks together nourishment for the bulbs. (v) The calyx-shaped flowers open only when the sun shines or when there is a lot of light; they close up in rainy weather and at night. (vi) crocus bulbs remaining in ground will always bloom a bit earlier than the ones planted the previous year. (vii) Beauty-naturalizes easily and will come back year after year.

Crocus sieberi ssp. *Tricolor*^[220–226]

Common name: Sieber's crocus, tricolor sieber's crocus.

History

A wondrous form of *crocus sieberi* from snow melt meadows in the mountains of Peloponessos in southern Greece. *Tricolor* is an hariloom cultivar dating from the early twentieth century. It is selection of *crocus sieberi* ssp *sublmis*. Here *tricolor* planted around a inardy Canadian-bred apricot called 'F *lavorcot*', often pokes through snow, it is a attributed to E.A. Bowles of myddelton house, a man dubbed the crocus king and dates from the pre-Forties. the clue is the name –*crocus sieberi tricolor* flower rerally does sport three colors and, at the time of writing, it is the only crocus thus blessed. Nothing to do with the French flag, the upper petals are a clear and even lilac-blue then comes a distinct white band while the throat of the flowers is a glorious golden color. Its exotic coloring aside, the flower starts off as a lotus bud shaped and then opens up into an ample bowl to display the three rings of color and its prominent

stames. It is a truly eye-catching flower and is early to grow to boot.

Herb: small, perennial, cromous. **Native:** southeastern Europe and Mediterranean. **Found:** mountain chelmos and Mt Ziria in north Pelepponese. **Habit:** clump-forming. **Growth habit:** erect. **Grows:** Balkans in Greece, especially in Island Crete. **Growth rate:** medium. **Height:** 5.1 – 10.2 cm. **Width:** 5.1 – 7.6 cm. **Time to reach full size:** 2-5 years. **Corm:** fibrous (reticulate) tunic. **Leaves:** grass-like, narrow, medium silvery stripe, fine , mid-green color. **Flowers:** chalic shape, fragrant, lilac-blue with prominent white bond encircling its bright golden –yellow center, 10 cm tall, graceful six petals deep purple petals, open and close on sunny days. **Throat:** broad yellow. **Anther:** golden yellow. **Pollen:** golden yellow, in center are eye-catching. **Style:** golden yellow, orange to red, divided into 3 branches from the line anther short fringed at the tips. **Capsule:** ellipsoid. **Seeds:** numbers, different size, brownish.

Phenology

February – March.

Characteristic

(i) The bulb will produce 4 or 5 flowers, so it produces a rich thicket of colors. (ii) The bud bursts through the ground before the leaves have really developed. (iii) when fully opening in the sun, the concentric rings of color, with orange yellow stigma and stamens in it produces a rich thicket of color. (iv) flower color is purple, white and yellow center. (v) It is slightly toxic. (vi) Use- alpine, container, mixed border, rock garden/wall. (vii) self- showing. (viii) self-growing. (ix) Cultivars: (1) Bowles's white (white with orange centre). (2) firefly (lilac). (3) Hubert Edelsten (outside deep purple with broad white bands, inside pale lilac with orange center). (4) Ronald Ginus (pale pink to white petals with dark purple feathering on the out-side and a yellow throat). (5) Violet Queen (deepamethyst-violet flowers, paler with in, with a rich, golden centre).

Crocus x stellaris Haw^[188,227–236]

Synonym: *Crocus lageniflorus* var. *stellaris* (Haw) Herb.

Common name: Dutch crocus, Spring crocus, Crocus.

English name: Yellow crocus.

Cultivar name: *Stellaris*.

History

Crocus stellaris Haw is hybrid of *c. anygustifolius* Weston x *c. flavus* Weston. A rare escape from cultivation or merely a throughout or gardenelic. Probable locally more or less establish. This hybrid probably is more wide spread yellow flowers crocus in Belgium, in cultivation as well as in the wild. This plant of uncertain origin cultivated for two hundred years, probably a sterile hybrid between *c. flavus* ssp. *flavus* and *c. anygustifolius*.

Plant habit: Herb/Forb. **Herb:** small, perennial, cormous. **Grow:** Garberville, California. **Distribution range:** Norway ISO No. source : Artsnarnebasen. **Height :** 1- 24 cm. **Plant appears:** hairless through-out but there are very small hair on the filament of the stamens and on the stigmas. **Distribution:** scattered in English; garden origin. **Corm:** tunic is coriaceous with parallel veins and no splitting at the base, reticulated upwards, uniting into a few teeth. **Leaves:** mostly 1-4 mm wide ,dark green linear with a white stripe. In cross section the leaf is not flat but with downward (revolute) curving edges. **Flowers:** orange – yellow, tepals are joined together are pure yellow on the inside but with purplish stripes (that extend from the upper part of the flower stalk). On the out-side, 6 numbers. **Stalk:** translucent membranous, bract around it, brownish. **Throat:** yellow, glabrous or pubescent. **Perianth – lobes:** suffused or striped purplish-brown on outside or if uni-formly yellow. **Bract:** 2, white. **Spathe:** 1, papery. **Segments:** 20-25 mm long, elliptic, sub-acute, giving the flowers and elongated appearance. **Anthers:** 3, yellow. **Pollen :** yellow. **Style:** 3 yellow or orange. $2n = 10$.

Phenology: February – March.

Characteristics

(i) the morphology of the e.g. tunic corm and color of the flower in *c. stellaris* is intermediate between *c. flavus* and *c. anustifolius*. (ii) hybrid origin of the two yellow flowered spring crocuses, marked that the orthographic writing of their names should be *c. stellaris* for the diploid hybrid, if regarded as a cultivars of garden origin or *c. stellaris* Haw, if of natural origin. Because the two parental species do not occur to-gether in nature, natural hybrids are unlikely to exist, but spontaneous hybridization has probably occurs in cultivation. Therefore it recommend the designation *c. stellaris*, implying that it is of garden origin.

Crocus tommasinianus Herb^[237–248]

Common name: species crocus, Snow crocus, Early crocus.

Latin name: *crocus tommasinianus*

History

Crocus tommasinianus (woodland crocus, Tommasini's crocus, Early crocus) often referred as to 'Tommies', were named after the botanist, Muzia G. Spirito de tommasini (1744-1879), who was Mayor of the city of Trieste. They are native of Bulgaria, Hungary and former Yugoslavia. They are often referred to as early or snow crocuses, but these terms are shared with several other species, although *crocus tommasinianus* is amongst the first to bloom. It grows in all soil types, produces lots of flowers and naturalizes (i.e. comes back year after year and multiplies) very easily. Also, it comes in various delightful shade of blue, mauve and purple. All in all, it's a terrific crocus to grow, increasing abundantly where it can become to nuisance by invading choicer species. A

number of color forms have occupied in gardens or been collected in the wild.

Plant habit: Herb/Forb. **Herb:** small, perennial, endemic, cormous. **Native:** Bulgaria, Hungary, Albania and former Yugoslavia. **Native climate:** cold winter with snow, warm summer with regular rainfall. **Habitat:** Oak and mixed forests and bushes between the hilly areas. **Soil:** poor to moderately fertile, well drained soil. **Native range:** Balkans, Hungry, Bulgaria, Serbia, Montenegro. **Height:** 8 cm. **Spread:** 0-0.1 m. **Time to ultimate height:** 2-5 years. **Plant range :** SE Europe. **Distribution:** hungary, Bulgaria, Albania, Croatia, Montenegro, Basnia and Herzegovina, Serbia, Macedonia. **Altitude:** 400 – 1500 m asl. **Corm:** 2 cm wide and 1 cm long. **Tunic:** vertical fibrilline is sometimes irregular agims only from the top. **Leaves:** 3-5 basal, narrow, linear, fully developed when it flowers, 5-7 mm wide, in the flowering time is short level or more flowers, deciduous, slender, strap-shaped, grey-green. **Flowers :** may not come from seeds if other tommasinianus varieties are in vicinity but they will still be a pleasure and the cormlets also come time, 2-4 cm tall, dark purple to pale lilac, sky blue are in shades ranging from light to dark blue. **Flower tube:** very light or white. Opening towards the inner side of the petals is significantly whiter. **Throat:** white, often with a silvery-white or cream exterior. **Perianth tube:** white. **Petals:** 6, pale silvery lilac to reddish purple, while the outer petals may be overlaid with silver and darker tips. **Anthers:** bright yellow, hairless. **Style:** divided into three short piece is shaped puffs and anther level. $2n = 16$.

Phenology

February–March.

Characteristics: (i) it will flower early in spring and is attractive to their insects that have become active. (ii) cultivars are used as ornamental plant. (iii) the flowers of this species is made thinner compared to the very similar *c. vernus*. The *c. vernus* flowers are shaped more like a glass. (iv) *c. tommasinianus* sunny weather, the flowers remain as *c. vernus* glass like a star when fully open. (v) flower close at night and open in the morning, but usually remain closed on rainy or cloudy days. (vi) it is common called snow crocus because it is one of the earliest of the crocuses to bloom

Cultivation

The long, snowy winter and cool summer has requested, cultural widely available- names clones include (i) White well (Purple), silver reddish (purple). (ii) Ruby Giant (Purple). (iii) Oliver wyatt and Taplow Ruby (reddish purple). (iv) Roseus (pink with silver out-side) (v) Pictus (lilac, grey out-side purple tips) (vi) Rarely seems is 1 versitom` a hybrid with *c. versicolor* (vii) *Crocus tommasinianus* (cobalt lavender). (viii) Barr's purple (amethyst violet). (ix) Albus (white tomimies).

Crocus vernus L. (Hill)^[249- 257]

Synonym (s)

Crocus grandiflorus Hegetschw
Crocus multiflorus Schur.
Crocus nervifidius Rehb.
Crocus parviflorus E.H.L. Krause
Crocus longiflorus Hegetschw, non Raf.
Crocus reineggeri Opix
Crocus aureus.

Herb: small, perennial, cormous. **Growth habit:** Forb/ Herb. **Native:** Alps, the Pyrenees and the Balkans. **Native climate:** Mediterranean. **Habitat:** half in the opening mixed forest and hilly areas are widely found in alpine lawn. **Height:** 10-15 cm. **Spread:** 0-0.1 m. **Distribution:** Germany, Austria, France, Switzerland, Italy, Croatia, Macedonia, Hungary (almost all of Europe's) **Altitude:** 300 – 2500 m. asl. **Corm and tunic:** tunic is thin membranous agims. **Root:** filiform adventitious. **Stem:** surrounded at the base by numerous pockets and two or three leaves. **Leaves:** opposite, 2-4 pieces, 5-7 mm at most, the level of the flowering time flowers, erect, synanthous, green with distinct white median stripe, pubescent. **Flower:** cup-shaped, 5-6 cm long, very large and length of the neck, with 6 division, purple color, the top with an occasional darker stripe, sometimes flowers are almost white with slim purple strips. **Filament:** white. **Anthers:** hairless, bright yellow. **Pollen:** yellow. **Style:** short piece in orange, are significantly above the shaped puffs and anther level. **Fruit:** capsule.

There are two sub-species

- (i) *Crocus vernus ssp. albiflorus* (Schultes) Asch & Graeb
- (ii) *Crocus vernus ssp vernus* Hill

***Crocus vernus ssp. vernus* Hill**

Also called Dutch crocus, comprises a large group of cultivation with various colors of the flower. *Crocus vernus* is also called spring crocus, and Giant crocus.

Synonym(s)

Crocus albiflorus Kit ssp *heuffelianus* (Herg) Hegi
Crocus heuffelianus Herb
Crocus vittatus Schloss & Vuk. Non. Ref.
Crocus discolor G. Reuss.
Crocus exiguus Schur
Crocus heuffelii Korn
Crocus scepusiensis (Rehmann & WoDI) Borbas.
Crocus napolitanus Mord. Laun & Loisel
Crocus purpureus Weston
Crocus albiflorus kit ssp *neapolitanus* (Ker Gawl) Hegi
Crocus banaticus Heuff. Non J. Gay
Crocus candidus Schloss & Vuk
Crocus uniflorus Schur
Crocus veluchensis Schoot, non Herb
Crocus babiogorensis Zapa !> 1

Herb: small, perennial. **Native:** Italy east words; naturalized in Britain. It has been known in Britain since middle Ages. Where it has thrived in Churchyards and old monastic grounds doing wonderful in grass, wide spread in mountains of central and eastern Europe, in meadows up to 1500 m. *C. vernus* ssp *albiflorus* in c. *sicalus*, similar to ssp *vernus* but flower 5, 5-7 cm tall. Mountain of the western and central Europe near melting snow, up to 2500 m ssp *vernus* is easy to grow and is the parent of the large flowered. **Growth habit:** bulbous, **Habitat:** half of the opening mixed forest and hill areas are widely fund in alpine lawn. **Height:** 10-12 cm. **Natural range:** Italy, Austria, Czechoslovakia, Hungary, Poland, Ukraine and Slavic states of the Balkans. **Altitude:** 300 – 2500 m asl. **Corm:** tunic, fibrous with some reticulation. **Leaves:** 4-6 mm wide, fully or partially developed at flowering times, 2-4 pieces, erect, green, synanthous, distinct with white medium stripe, pubescent. **Flowers:** 8-12 cm tall, lilac, purple or white with varying strips out-side and on the tube, live for 3-4 days. **Perianth:** 13 -15 cm long, 6 tepals with 1.5 -5.5 cm long. **Perianth tube:** 3-4 mm diameter is about the length of whole perianth and its lower part extending down into the ground, surrounded by a long membranous leaf. The orange colored androcium and the upper part of the styles are surrounded by six perianth lobes arranged in cup-like formed. **Filament:** 3 stamens, 21 – 30 mm long attached upper part of the perianth tube, white. **Anthers:** 10-17 mm. hairless, bright. **Ovary:** of the pistil, 6-10 mm tall, grow the grounds on a stalk with length of 5-6 cm, which is a stem with cross section close to pentagon, style length 10-13 cm. **Pollen grains:** Yellow, 103.9 µm. These grains were inaperturate, with thick layer of intine and much thinner layer of exine. Numerous yellow Trypine were observed on the surface of the pollen grains. Pollen variability was 79 %. **Style:** 3 branched, orange and expanded at the tips, each of them has the shape of the funnel open on its side and irregularly incised from the top. The highest located part of style branches are flattened and strongly folded, while their apical portions are densionly covered by papillae. The region producing papillae is stigma of the pistil. **Fruit:** capsule, produced by ovary hudden in the ground. **Capsule:** born above the ground by the elongating flower stalk. 2n = 16.

Phenology

March – April.

***Crocus vernus* (Dutch crocus)**

One of the most popular species, *crocus vernus* (Dutch crocus) is an early spring blooming bulb that is widely grown in gardens or used for winter forcing. Exposure: fall sun, partial sun. Season of interest : spring (early). Height: 10–15 cm. Spread: 5-7 cm, characteristic: flowers showy. Its flowers are larger than any other of the crocuses , hence its common names of large flowering crocus or giant crocus. The range from yellow, white and purple to striped or bronze. Many popular

hybrids of this crocus have been developed over the years. Few species have described as follows:

1. *Crocus vernus* `Flower Record` (Dutch crocus)

Giant Dutch crocus `Flower Record` bears large, cup-like violet –mauve blooms with orange stamen. Extremely vigorous, long-lived and appropriate for naturalizing, this crocus belongs to the *Crocus vernus* group, known for its flowers that are larger than any other of the crocus. This crocus blooms for about 3 weeks in early spring and naturalizes easily.

2. *Crocus vernus* `Jeanne d`Arc` (Dutch crocus`)

Award – winning crocus `Jeanne d`Arc` is a popular cultivar with elegant, large, cup- like pure white flowers with a striking bright orange pistil and a small purple base. Extremely vigorous, long-lived and appropriate for naturalizing, this crocus belongs to the *Crocus vernus*, known for its flowers that are larger than any other of the crocuses.

3. *Crocus vernus* `Pickwick` (Dutch crocus)

Giant Dutch crocus `Pickwick` is a cheerful sight with its elegant, large, cup-like silver-lilac flowers with darker lilac strips. Extremely vigorous, long-lived and appropriate for naturalizing, this crocus blooms for about 3 weeks in early spring. The calyx-shaped flowers open only when the sun shines or when there is a lot of light; they close up in rainy weather and at night.

4. *Crocus vernus* `Remembrance` (Dutch crocus)

Giant Dutch crocus `Remembrance` is a cheerful sight with its elegant, large, cup- like violet-purple flowers with a silvery gloss and a dark base. Extremely vigorous, long lived and appropriate for naturalizing, this crocus blooms for about 3 weeks in early spring. The calyx-shaped flowers open only when the sun shines or when there is a lot of light; they close up in rainy weather and at night. Growing up to 10-15 cm, this beauty naturalizes easily and will come back year after year.

5. *Crocus vernus* `Violet vanguard` (Dutch crocus)

This sport of the famous `Vanguard` produced large flower of nearly uniform bluish-lilac, from their tips of their floral tubes.

6. *Crocus vernus* `Striped Banner` (Dutch crocus)

The sumptuous flowers of this rare, Dutch hybrid. Crocus are silvery white with generous violet feathering.

7. *Crocus vernus* `Queen of the Blues` (Dutch crocus)

The soft silvery-blue flowers of this 1916 introduction are still the standard by which blue Dutch hybrid crocuses are judged.

8. *Crocus vernus* `Pallas` (Dutch crocus)

The hauntingly beautiful flowers of this nearly forgotten but still unsurpassed 1905 introduction are grayish-white with soft amethyst-blue veining.

9. *Crocus vernus* `Maximilian` (Dutch crocus)

This medium -sized, lilac-blue vernus cultivar is nowhere to be found in the trade.

10. *Crocus vernus* `Jago` (Dutch crocus)

If you find the typical Dutch hybrid crocus to be a bit bulky for your taste, the relatively dainty lilac-blue flowers of this Ruksans introduction may be more to your liking. A purple Vhevron ornaments the tip of each `petal` of this delightful cultivar.

11. *Crocus vernus* `Alaska` (Dutch crocus)

The large white flowers are strikingly accepted with deep lavender-blue throats, the color continuing into the `petals` as irregular streaking.

12. *Crocus vernus* `Enchantrees` (Dutch crocus)

Soft, pale blue flowers with a silvery gloss on the exterior.

13. *Crocus vernus* `Grand Maitre` (Dutch crocus)

Soft, dark blue flowers.

14. *Crocus vernus* `Purpurea Grandiflora` (Dutch crocus)

Deep purple flowers, calyx-shaped flowers open only when sun-shines or when there is a lot of light, they close up in rainy weather and at night.

15. *Crocus vernus* `Silver coral` (Dutch crocus)

Soft, white, purple base of the flowers.

Crocus versicolor Ker-Gawl^[20,102,119,198,199, 201, 204, 258– 263]

Vernacular name

Deutsch: silberlack-krokus

Synonym(s)

Crocus cretensis Eugene
Crocus fragrans Haw
Crocus mendionalis Risso
Crocus reinwardtii Rchb
Crocus subapenninus Hern
Crocus versicolor ssp *cretensis* (Eugene) Nyman
Crocus versicolor var. *affinis* Sabine
Crocus versicolor var. *elegans* Sabine
Crocus versicolor var. *fioroundus* Sabine
Crocus versicolor var. *gallicus* Herb
Crocus versicolor var. *gawlen* Sabine
Crocus versicolor var. *haworthii* Sabine
Crocus versicolor var. *inconspicuous* Sabine
Crocus versicolor var. *lineatus* Sabine
Crocus versicolor var. *moriean* Sabine
Crocus versicolor var. *negiectus* Sabine
Crocus versicolor var. *peotinatus* Sabine
Crocus versicolor var. *plumosus* Sabine
Crocus versicolor var. *princeps* Herb
Crocus versicolor var. *propinquus* Sabine
Crocus versicolor var. *purpureus* Sabine
Crocus versicolor var. *similis* Sabine
Crocus versicolor var. *stellatus* Sabine

Crocus versicolor var. urbanus Sabine
 Crocus versicolor var. venustus Sabine
 Crocus versicolor var. violaceus Sabine

Botanical name: Crocus versicolor `Picturatus`

Common name: Cloth-of-silver crocus.

Other name: Crocus versicolor Picturatus

English name: Picturatus cloth of silver.

Once very widely grown with many name cultivars, today only `Picturatus` is widely available. It is very attractive and straight forward plant with added bourse of a honey scent (in at least one widely cultivated clone).

Herb: small, perennial, cormous. **Native:** mountains France and Italy. **Habit;** erect, clump-forming. **Native climate:** Mediterranean. **Wild habitat:** calcareous areas, in forest clearing , on short grassy and rocky areas. **Distribution:** SE France, Monaco, New Italy Alps. **Height:** 5-8 cm. **Spread:** 5 cm. **Total maturity time:** 2-4 years. **Altitude:** 1500 m asl. **Corm:** tunic membranous and vertical fibrillin. **Leaves:** grey-green, 1.5–3.0 mm wide, 3-5, usually reaching the base of the flowers, white stripe in the middle of the leaves and prominent and wide. **Flowers:** 1 or 2, range from cup to goblet shaped, 10 -12 cm. high, fragrant, white, purple and lilac, clear or has dark mauve, all inner and outer surface of the petals distinctly thin purple strips. This is more evident in the bottom lines of the petals. The inner lines are less pronounced in the petals, white collar. Flowers are purple strips on the upper side and white tube. **Throat:** usually pale-yellow, hairless. **Spathes:** present. **Bract:** solitary or accompanied by narrow bracteole. **Segments:** obtuse or sub-acute. **Perianth:** lobes, 2.5 – 3.5 cm x 7-10 mm. **Filament:** yellow. **Anthers:** yellow. **Pollen:** yellow **Style:** divided into 3 yellow or orange branches, each expanded and sometimes slightly lobed at the apex, stigma frilly, white. $2n = 26$.

Phenology

February–March.

Characteristics

The most frequently, cultivated variant of this species is a white-flowered. Conspicuously striped cultivar known as `Picturatus`. The closest relatives are crocus imperati, crocus malyi and crocus minimus. Crocus imparati usually has much more richly lalic colored flowers and `greener` leaves, while crocus vesicolor are some what `gray-green`. Crocus malyi has almost uniformly white flowers which lack outer strips and also differs in some leaf characteristic. It is also related to crocus minimus, which often has much larger purple stain on the outer petals of slightly different shape.

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REFERENCES

1. www.erumitsburg.net/gardens/articles/frederick/2004/early.htm
2. www.plantsrescure.com/tag/crocus-hybrid/
3. Zhao yu- Tang. 1985. Iridaceae in : Pei Chien and Ting Chin-Tsun, eds. Fl-Recipabl Papularies sin. 16, 120 -198.
4. http://www.gardening.cornell.edu/homegardening/sceneabo.html
5. http://garden.org/learn/articles/view/2040/
6. https://www.99roots.com/en/plants/cloth-of-gold-crocus, 37145
7. https://www.rhs.org.uk/plants/detailed?planted=582
8. plantlust.com/plants/crocus-angustifolius-cloth-of-gold
9. encyclopedia.alpinegardensociety.net/plants/crocus/angustifolius-author-weston
10. www.alpinegardensociety.net/plants/crocus/angustifolius/8
11. https://www.rhs.org.uk/plants/4837/crocus-angustifolius/detail
12. https://en.wikipedia.org/wiki/crocus/angustifolius
13. crocusmania.blogspot.in/search/label/angustifolius
14. Weston, R. Crocus angustifolius. Uni Bot., 1771; 2: 238.
15. saxena, R.B. Botany, Taxonomy and Cytology of crocus series reticulate, world Journal of Pharmaceutical and Medical Research (WJPMR), 2016; 2(3): 53-73.
16. en.hortipedia.com/wiki/crocus-angustifolius
17. www.wikiwand.com/es/crocus-angustifolius
18. www.monticelloshop.org/692612htm/
19. Saxena, R.B. Botany, Taxonomy and Cytology of crocus verni-series, Indo-American Journal of Pharmaceutical Sciences, 2015; 2(4): 757-763.
20. Mathew, B. The crocus. A revision of the genus crocus (Iridaceae)- Timber Press, Portland, London, 1982.
21. Kerndorff, H., Pasche, E., Blattner, F.R. and Harpke, d. Crocus biflorus Miller (Lilliflorae, Iridaceae) in Anatolia. Part IV. Stapfia, 2013; 99: 159–186.
22. https://wiciplantae.se/index.php/crocus-tauricus
23. Steudel and Ernst, G.V. Crocus biflorus parkinsonii. Nomenclator Botanicas ed., 1840; 2(1): 441. (November Bot.).
24. leont`eric, K.V. Flora of the USSR Jerusalem – (eng) Libris, 1963.
25. Saxena, R.B. Botany, taxonomy and Cytology of crocus biflorus series – A review. European Journal of Biomedical and Pharmaceutical Sciences, 2015; 2(5): 179–246. ISSN 2349 – 8870.

26. www.alpinegardensociety.net/plants/crocus/biflorus-tauri/28en.hortipedia.com/wiki/crocus-biflorus-subsp-tauri.
crocusmania.blogspot.in/search/label/tauri.
27. Jacobsen, N., Van Scheepen, J. and Orgaard, M. The crocus chrysanthus-biflorus cultivar. *The New Plantsman*, 1977; 9: 233-234.
28. Candan, F. and Ozhatay, N. *Crocus chrysanthus s. lato* (Iridaceae) in Turkey. *Ann. Bot. Fennici*, 2013; 50: 423 – 430.
29. Mathew, B. Turkish crocuses *Crocus* Group Bulletin. Nr., 1975; 1.
30. Herbert. *Crocus annulatus*. Herbert var. *chrysanthus* Herbert. *Bot. Mag.*, 1841; 67: Dub 1.
31. Herbert. 1943. *Crocus chrysanthus*. *Bot. Reg., Misc.*, 1841; 29: 27: 83.
32. Sin, L. and cardan, F. Ecological properties of some crocus taxa in Turkey. *African Journal of Biotechnology*, 2009; 8(9): 1895–1899.
33. Ozdemir, c., Akyol, Y., Yetisen, K., Bezdag, B. and Kocabas, O. Morphological and Anatomical study on crocus chrysanthus (Herbert) Herbert (Iridaceae). *Igdir Univ. J. Ins. Sci & Tech.*, 2013; 3(1): 25–30.
34. Alpine Garden Society. U.K.
35. Candan, F. and Kesercioglu, T. Cytaxonomic investigation on the species of *c. chrysanthus* (Herbert) Herbert in: Gokcenus, H. (ed), *Proceeding of the International Conference on Environment, Survival and Sustainability*, 2007: 2: 19-24. Near East university Nicosia.
36. Ruksans, J. *Crocus danforolia* Maw and *c. chrysanthus* (Herbert) Herbert (Iridaceae) and some of their allies in Turkey and Iran. *International Rock Gardener Available from* <http://www.srgc.org.o.k>. accessed, April 2014.
37. www.gardenersworld.com/plants/crocus-chrysanthus-var-fuscotinctus/1118.html
38. www.gardenshp.telegraph.co.uk/plants/bulb/crocus-bulb/crocus-chrysanthus-var-fuscotinctus/classis.1000000254/
39. Neatherland Bulb Company. www.neatherlandbulb.com
40. www.learn2grow.com/plants/crocus-chrysanthus-var-fuscotinctus/
41. gardenNavigalor.Navigate.botariieg.ardeus.org/web-oi/ocegi2.exe/INT-EcomDispp/?NAMENUM3423&DETAIL=1.
42. Dave's Garden, davesgarden.com/guides/pf/75648/H6
43. Rockerias, beda & pots. www.tesseloan.net.au/genus/crocus/8214-anow-crocus-fuscotinctus
44. Rix, M. and Phillips, R. 1981. *The Bulb Book; A photographic Guide to over 800. Hardy Bulb Par book. Ltd. ISBN 0-330-26481-8*
45. Rayber, D.V. *Rock Garden Quarterly*, 1997; 55(2): 95.
46. www.easytogrowbulbs.com/p-146-crocus-chrysanthus-advance.aspx
47. www.sarcharaven.com/flowers/bulbs/bulbs-for-naturalising/crocus-chrysanthus-advance.htm
48. www.missouribotanicalgarden.org/plantFinder/PlantFinderDetails.aspx&Taxonid=256249&isprofile=1&gen=crocus.
49. www.gardenersworld.com/plants/crocus-advance/1341.html
50. www.shootgardening.co.uk/plant/crocus-aubade
51. www.turnflora.com/index.php?/crocus-chrysanthus/c
52. www.davesgarden.com/guides/pf/go/75647/Hb/Ard-schenk
53. www.paghat.com/crocusbluepeorl.html
54. www.enenprothers.com/store/specie-crocus-blueperal
55. www.botinus.com/products/blue-peral-snow-crocus.html
56. www.whiteflowerform.com/140414-product.html
57. www.easytogrowbulb.com/p-147-chrysanthus-blue-pearl.aspx
58. <https://www.rhs.org.uk/plants/details/?/planted=2556>
59. Lambley Nurserg Burnside, Lester Road Ascot, Victoria 3364
60. www.crocus.co.uk/plants/crocus-chrysanthus-cream-beauty/classid.1000000352/
61. www.gardenersworld.com/plants/crocus-chrysanthus-cream-beauty/1178.html
62. www.shootgardening.co.uk/plant/crocus-chrysanthus-cream-beauty
63. www.gardens4you.co.uk/index-php?/crocus-chrysanthus/crocus-chrysanthus-Dorothy-20flowers-beautyHvs879lys
64. www.learn2grow.com/plants/crocus-dorothy
65. www.digtherdirt.com/plants/13108-crocus-crocus-chrysanthus-e-p-bowles
66. Fakhral, F. and Evans, P.K. Morphogenic potential of cultivated explants of crocus chrysanthus cv. E.P.Bowles, *J. Expt. Bot. UK*, 1989; 40(7): 809-812.
67. <http://www.rhs.org.uk/plants/64896/crocus-chrysanthusE.O.Bowles/Details&returnush=2plants%2Fresh-results9/>
68. [www.ausgardener.com.au/products.php?-product=crocus=%252d-E.P. Bolwes](http://www.ausgardener.com.au/products.php?-product=crocus=%252d-E.P.Bolwes)
69. backyardgarsen.com/plantname/pda-ac.09.html
70. <http://www.paghat.com/crocusgypsygirl.html>
71. www.gardernersworld.com/plants/crocus-chrysanthus-gipsy-girl/376.html
72. www.easytogrowbulbs.com/p-150-crocus-chrysanthus-gipsy-girl.aspx
73. www.davesgarden.com/guides/pf/140013/Hb
74. www.hillvicwreplants.com.au/plant/crocus-chrysanthus-jeannine
75. Royal Horticultural Society, U.K.
76. Gardeners world.com
77. www.easytogrowbulb.com/p-151-crocus-chrysanthus-prins-clause.apex
78. www.bulbdirect.com/Index.php?/Flower-Bulb_crocus/crocus-chrysanthus-prins-claus.20-flower-bulbHVTBJtyllfggE
79. <https://www.paghat.com/crocusprinsclaus.html>

80. www.gardenersworld.com/plants/crocus-chrysanthus-prins-claus/1711.html
81. www.o.uk/product/botanical-crocus-prins-claus/
82. www.easytogrowbulb.com/p-152-crocus-chrysanthus-romance-asp
83. <https://www.jardins-sans-secret.com/details13350/crocus-chrysanthus-romance.html>
84. davesgarden.com/guides/pf/go/98680/Hb
85. www.avanbulbs.co.uk/s/crocus-chrysanthus-snow-bunting/88/product.aspx
86. <https://www.rhs.org.uk/plants/258522/crocus-snow-bunting/details>
87. www.backyardgardener.com/plantname/pdf-555b.html
88. <https://www.rhs.org.uk/plants/97124/crocus-chrysanthus-zwanenburg-bronze>
89. hilliewareplants.com/plant/crocus-chrysanthus-zwanenburg-bronze
90. devesgarden.com/guide/pf/go/102300/Hb
91. Saxena, R.B. Botany, Taxonomy and Cytology of crocus biflori series, European journal of Biomedical and Pharmaceutical Sciences, 2015; 2(3): 798-829.
92. www.alpinegardensociety.net/plants/crocus/dalmaticus/47
93. www.theplantlist.org/tbl%201/record/kew-327235
94. en.hortipedia.com/wiki/crocus-dalmaticus
95. crocusmania.blogspot.in/search/label/dalmaticus
96. www.pacificbulbsociety.org/pbswiki/index.php/springBloomingcrocustwo
97. encyclopedia.alpinegardensociety.net/plants/crocus/dalmaticus
98. Visiani, R. *Crocus reticulatus* var. *dalmaticus* (Herb) J. Hort. Soc. London, 1847; 2: 279.
99. Saxena, R.B. 2016. Botany, Taxonomy and Cytology of crocus series reticulate. World Journal of Pharmaceutical and Medical Research (wjpmr) 2. 3. 53-73. ISSN 2455-3301 WJPMR.
100. Rix, M., Phillips. 1981. The Bulb Book. Amazon.co.uk. 26.
101. Syngé Patrick, M. 1971. Collins Guide of Bulbs. Ed.2 London. Collins. 7.
102. www.ivudenegardens.co.uk/Bulb%20colchicum%20crocus%20gellery/crocusetruscus.html
103. www.iucnredlist.org/details/161939/0
104. Carta, A. and Peruzzi, L. 2011. *Crocus etruscus*. The IUCN Red list of threatened species 2011 : T16/939A5516365.
105. Parl. 1860. *Crocus etruscus*. Fl. Ital (Parlatore) 3. 2. 228.
106. *Crocus etruscus*. Red List threatened species. IUCN. Retrieved 22 July 2013.
107. www.gbif.org/species/113565007.
108. encyclopedia.alpinegardensociety.net/plants/crocus/etruscus
109. RHS A-Z encyclopedia of garden plants united kingdom. 2008. Dorling Kindersely. 1136.
110. Carta, A., Pierini, B. Alessandrini, A., Friganani, F. and Peruzzi, L. 2010. Contributo alla conoscenza della flora vascolare endemica de Toscana ed a ree conrmini. 1. *Crocus etruscus* Parl (Iridaceae). Inform. Bot. Ital., 42(1): 47-52.
111. crocusmania.blogspot.in/search/label/etruscus
112. www.rareplants.co.uk/product/crocus-etruscus-cg-8315/
113. <https://en.wikipedia.org/wiki/crocus.etruscus>
114. www.jparkers.co.uk/25-crocus-etruscus-zwanenburg
115. <https://www.vanengelen.com/crocus-etruscus-zwanenburg.html>
116. <https://www.shootgardiening.co.uk/plant/crocus-etruscus-zwanenburg>
117. www.paghat.com/crocusetruscus.html/
118. <https://www.rhs.org.uk/plants/97385/crocus-etruscus-zwanenburg/Detail>.
119. <https://www.johnsheepers.com/crocus-etruscus-zwanenburg.html>
120. davesgarden.com/guides/pf/go/119743/Hb
121. www.vogelvry.com.au/crocus-etruscus-zwanenburg-spring/
122. <https://beginnerbotany.wordpress.com/2014/02/>
123. www.gbif.org/species/3586380
124. Haworth, A.H. Transactions of the Horticultural Society of London, 1812; 1&2, London. W. Bulmer.
125. Haworth, A.H. On the cultivation of crocus, with short account of the different species., Feb, 1809; 7: 138.
126. library.rit.edu/cary/crocus-stellaris-0
127. Orgaard, N., Jacobsen, N. and Hestop-harvison. The hybrid origin of two cultivars of crocus (Iridaceae) analysed by molecular cytogenetics included Genomic southern and in situ hybridization. Annals of Botany, 1995; 76: 253-262.
128. wbd.etbioinformatics.nl/bis/flora.php?menuentry=s oorland&id=4878.
129. <https://www.rhs.org.uk/plants/82389/crocusXluteus-stellaris/Details?>
130. encyclopedia.alpinegardensociety.net/plants/crocus/stellaris
131. Saxena, R.B. A detailed study of crocus flavi-series. Carib. J. Sci. Tech, 2014; 2: 509-518.
132. Alpine Garden Society .worcestershive WR 10 3JP U.K.
133. Newzeland Alpine Garden society, Lincoln University, Canterbury, Newzeland N Z A G S. P.O. 298-4, Christ-chruch, Newzeland.
134. Canan, O., Baran, P. and Akyol, Y. The morphology and anatomy of crocus flavus Weston ssp. flavus (Iridaceae). Turk. J. Bot., 2006; 30: 175-180.
135. www.plantsdh.gr/en/plants-library/herbaceous/388-crocus-flavus.
136. <https://sv.wikipedia.org/wiki/Gullkrokus>
137. www.alpinegardensociety.net/plants/plant-portraits/crocus+flavus/17/
138. <https://www.rhs.org.uk/plants/92449/crocus-flavus-subsp-flavus/Detail>
139. <https://en.wikipedia.org/wiki/crocus-flavus>
140. greenlifeuniverse.com/species/crocus-flavus.htm/
141. [crocusmania,.blogspot.in/search/label/flavus](http://crocusmania.blogspot.in/search/label/flavus)

142. <https://www.tubives.com/index.php&sayfa=1&id=9375>
143. www.greenfingers.com/gardenbase/plant/view.asp?id=18070
144. www.rareplants.co.uk/product/crocusgargaricus-gargaricus
145. www.alpinegardensociety.net/plants/crocus/gargaricus+gargaricus/53
146. crocusmania.blogspot.in/search/label/gargaricus
147. Herbert, W. Gargaricus. Bot. Mag., 1841; 67: t3886.
148. www.greenplantswap.co.uk/plants/5498-crocus-gargaricus
149. Boissir, P.F. and Reuter, G.F. Crocus graveolens. Fl. Orient, 1845; 5: 107.
150. en.hortipedia.com/wiki/crocus-gargaricus
151. www.lightscepes.info/onewithnature/nature-garden/wildflowers/iridaceae/ye;ow-spring-crocus-crocus-gargaicus
152. www.litbulbgarden.com/catalogue2.php
153. www.alpinegardensociety.net/plants/crocus/gargaricus+herbertii/54
154. www.srgc.net/forum/index.php?topic=4926.195
155. www.augibulbs.com/catalog.php?c=43
156. www.rareplants.co.uk/product/crocus-herbertii-jp-91-65
157. Mathew, B. Crocus herbertii. Plantsman.n.s, 2009; 1. 57.
158. Koch, K. 1848. Crocus thirkeanus, Linnea, 21: 633.
159. www.srgc.org.uk/genera/logdir/2013july09137332995crocus-botany.pdf
160. Mathew.B. Crocus gargaricus ssp herberti. Bot. Mag. (Kew Mag), 1984; 1: 72.
161. <https://www.odysseybulbs.com/springcocus.html>
162. Isik, S. and Donmez, E.O. Pollen morphology some Turkish crocus (Iridaceae) species. Acta Biologica cracoviensis series Botanica, 2006; 48(1): 85-91.
163. Maw and Regel. Crocus korolkowii. Turdy imp. S. Peteburgsk. Bot. sada., 1879; 6: 499.
164. Boissier, B.E. Crocus korolkowii. Fl. Or, 1884; 5: 109.
165. Fedtsch, B. Crocus korolkowii. In Kom. Fl. U.S.S.R., 1968; 4: 387.
166. Stewart. R.R. Crocus korolkowii. Ann. Cert. Vasc. pl. W. Pak. Kashm, 1972; 62.
167. Wendelbo, P. and Mathew, b. Crocus korolkowii. In Res. f. Fl. Iran, 1975; 112: 7.
168. Saxena, R.B. Botany, taxonomy and Cytology of crocus orientales series. Asian Journal of Science and Technology, 2015; 6(5): 1406-1410. ISSN: 0976-3376.
169. davesrden.com/guides/pf/b/iridaceae/crocus/korolkowii/cultivar/o/Hb.
170. Cullen, j., Sabina, G., Knees, H. and Cubey, S. The European Garden flora Flowering Plants. A. manul for the identification, 2011.
171. <https://www.paghat.com/crocus-mountainglory.html>
172. www.digthedirt.com/plants/15838-crocus-crocus-korolkowii
173. www.efloras.org/floratoreon.aspx?flora-id=120&taxon-id=240010020.
174. encyclopaedia.alpinegardensociety.net/plants/crocus/korolkowii
175. www.alpinegardensociety.net/plants/crocus/korolkowii/70
176. crocusmania.blogspot.in/search/lobel/koro;kowii
177. Maw and Regel. Crocus Korolkii/70 owii. Descr. Pl. Nov, 1879; 7.213 (as `korolkowii`).
178. <https://books.google.co.in/books?isbn=0521761476>.
179. aob.oxfordjournals.org/content/7613/253full.pdf
180. <https://www.shootgardening.co.uk/plant/crocus-x-luteus-golden-yellow>
181. <https://www.99roots.com/en/shop/crocus-x-luteus-yellow-mamouth-p5564>
182. <https://www.gardenia.net/plant/crocus-luteus-golden-yellow>
183. www.easygrowthbulb.com/p-156-crocus-venus-goldenyellow.aspx
184. <https://www.rhs.org.uk/plants///crocus-golden-yellow/Details>.
185. [shiptonbulbs.co.uk/crocus-x-luteus Golden Yellow](http://shiptonbulbs.co.uk/crocus-x-luteus-Golden-Yellow).
186. Orgaard, M., Jacobson, N. and Heblop-Harrison, J.S. The hybrid origin of two cultivars of crocus (Iridaceae) analysed by molecyler cytogenetics including Genomic southern and in situ Hyberdization. Annals of Botany, 1995; 76: 253-262.
187. Herbert. Crocus lageniflorus var. luteus (Lam) Herb. Bot. Mag., 1841; 67.t. 3869.
188. plantlust.com/plants/38601/crocusxluteus-golden-yellow/
189. www.learn2grow.com/plants/crocus-x-luteus-golden-yellow
190. www.missoribotanicalgarden.org/plantFinderDetails.aspx?
191. www.crocus.co.uk/plants/-/crocus-luteus-golden-yellow/classis.20000173961
192. <https://www.rhs.org.uk/plants/detail?plntid=592>
193. www.alpinegardensociety.net/plants/crocus/malyi/79
194. Brickell, C. (editor-in-chief). RHS A-Z encyclopedia of garden plants Uk: Dorling Kindersley, 2008; 1136
195. Ruksans, j. Crocuses. A complete guide to the grnus, timber press, Portland, London, 2010; 1-2161.
196. Govaert, R. World checklist of seeds plants 3 (1,2a & 2b) continental publishing. Deurne, 1999; 1-1592.
197. Tution, T.G. Flora europaea, Cambridge University press, 1980; 1-452.
198. Mathew. B. 1980. Crocus L. Flora of Europaea. 5. 92.
199. Water, E., Gotz, E., Bodeker, N. Seyboldr. 2008. Der Große Aander. Eugen Ulmar Ka. Stuttard. ISBN 978-3-8001-5406-7 (Ger).
200. Visiani, R. Crocus malyi. Mem. Reale 1st Veneto Sci., 1871; 16: 213.
201. Saxena, R.B. Botany, Taxonomy and Cytology of crocus versicolores series. The Experiment, 2014; 21(3): 1487-1494. ISSN 2319-2119.
202. <https://www.rhs.org.uk/plants/details?plantid=2567>

203. Pulevic, V. Prilog poznananju morfologiji rasprostranjenja vrste *crocus malyi visiani*. Zbornik R, visianija poveremens izdanja Muzeja grada sibenika, 1983; 10: 309–313.
204. Hrsak, V. and Lukac, G. The genus *crocus* L in the Paklenica National Park. *Acta Bot. Croat.*, 2001; 60(1): 97-101. ISSN 0365-0588.
205. www.pacificbulbsociety.org/pbswiki/index.php/spring-Blooming-crocus-four.
206. <https://www.crocusmania.blogspot.in/searchlabel/malyi>
207. www.wikiwand.com/en/crocus_malyi
208. www.missouribotanicalgarden.org/plantFinder/plantfinderdetails.aspx?taxonid=244094&isprofile=1gen=crocus.
209. <https://www.gardenia.net/plant-family/crocus-sieberi-botanical-crocus>.
210. www.alpinegardensociety.net/plants/crocus/sieberi+atticus/110
211. <https://www.rhs.org.uk/plant/crocus-atticus/Details?-%2plants%2>.
212. www.learn2grow.com/plants/crocus-sieberi-ssp-atticus
213. <https://planthunters.Blogspot.com/2012/03/crocus-sieberi-ssp-atticus>.
214. crocusmania.blogspot.in/search/label/sieberi.
215. *Crocus atticus* (Boiss & Orph) Orph. *Bull. Petersb.* 1869; 118.
216. <https://www.gardenia.net/plant/crocus-sieberi-ssp-atticus-firefly>.
217. <https://www.rhs.org.uk/plant/258250/crocus-sieberi-subsp-atticus-Firefly/Details>
218. <https://en.wikipedia.org/wiki/crocus-sieberi>
219. <https://www.vanengelen.com/flower-bulbs-index/crocus/species-crocus/crocus-sieberi-ssp-sublimus-tricolor.html>
220. www.rareplants.co.uk/product/crocus-sieberi-tricolor/
221. <https://www.avonbulbs.co.uk/autumn-plnted-bulbs/crocus/crocus-sieberi-tricolor>
222. <https://www.ashridgetrees.co.uk/crocus-sieberi-tricolor>
223. www.learn2grow.com/plants/crocus-sieberi-ssp-sublimis-tricolor.
224. www.telegraph.co.uk/gardening/gardengadvice/9886419/why-every-gardener-should-grow-crocuses.html
225. aob.oxfordjournals.org/content/76/3/253fullpdf
226. wbd.etibioinformatics.nl/bis/flora.php?menuentry=sooten&id=4878.
227. <https://beginnersbotany.wordpress.com/tag/crocus-x-stellaris>
228. Clive Stace. *New Flora of British Isles*, Cambridge University Press.
229. www.paghat.com/crocusstellaris.html
230. Maw, G. 1886. *Crocus stellaris* Haw. A monograph of genus *crocus*. t 37
231. www.gbif.org/species/3586380
232. Haworth, A.H. *Crocus x stellaris*. *Trans. Hort. Soc. London*, 1812; 1: 136.
233. Stace, C. 2010. *New flora of British Isles*. 3rd ed: xxxii+1232. Cambridge University Press.
234. alienplantsbelgium.be/content/crocus-x-stellaris.
235. Royal Horticultural Society. United Kingdom.
236. McAvooy, W, A. and Bennett, A.K. Data documentation. *The Flora of Delaware: An annotated checklist*. Department of Natural research and environment. Dover., 2001.
237. John, T. and Kartsz. *Biota and north American progress/curated and maintaint-USDANRCS national Plant Data Team*.
238. encyclopedia.alpinegardensociety.net/plants/crocus/tommasinianus
239. <https://www.avonbulbs.co.uk/autumn-planted-bulbs/crocus-tommasinianus>.
240. www.theplantexpert.com/springbulbs/crocus4.html
241. <https://en.wikipedia.org/wiki/crocus-tommasinianus>
242. crocusmania.blogspot.in/search/label/tommasinianus
243. www.crocus.co.uk/plants/-/crocus-tommasinianus/classid-1000000372/
244. <https://www.rhs.org.uk/plants/25699/i-crocus-tommasinianus-i/Detailed>
245. www.missouribotanicalgarden.org/plantFinder/plant-finder-Details.aspx.taxonid=244106&isprofile=o&
246. <https://www.treppeu.de/Blumenzwlebe.in/herbestflcenzuhg/crocus-korokussc/Fruet>
247. crocusmania.blogspot.in/search/label/vernus
248. <https://en.wikipedia.org/wiki/crocus-vernus>
249. Hill. 1765. *Crocus vernus* L. *Veg. Syst.* 10. 1.
250. rbs-web2.rbge.org.uk/cgi-bin/nph-realbtree.pl/feout?Family-XREF=GENUS_XREF=crocus&species_XREF=vernus.
251. www.abc.co.uk/gardening/plants/plant-finder/plant-pages/5509.sltm/
252. Greenlifeuniverse.com/species/crocus-vernus.html
253. Weryszko-Chmielewska, E. and Chwil, H. 2011. Structure of the floral parts of *crocus vernus* (L) Hill. *Acto Agrobotanica*. 64. 4. 35-46.
254. www.odysseybulbs.com/springcrocus.html
255. www.brickfieldspark.org/data/crocus.htm
256. Gawler, K. 1808. *Crocus versicolor*. *Bot. Mag.* 28, 1110
257. Sabine. 1830. *Crocus versicolor* var. *floribundus*. *Trans. Hort. Soc. London*.
258. Govert. 2011. RHA world checklist of selected plants families published up date. Facilitated by the trustees of the Royal Bot. Gard. Kew, London.
259. Syngé Patrick, M. 1971. *Collins Guide of Bulbs*. Edn. 2 London Collins. 17.
260. crocusmania.blogspot.in/search/label/versicolor
261. www.alpinegardensociety.net/plants/crocus/versicolor/126.