

Lecture VIII : Commercial cultivation of gladiolus

INTRODUCTION

Gladiolus is an important commercial flower crop and is very popular as cut flower both in domestic and international market. It is said to be the 'Queen of bulbous flower crops' and commonly known as 'Sword Lily' or 'Corn flag.' The name gladiolus was originally coined by Pliny the Elder. *Gladiolus* spp. (Tournefort.) L. takes its name from the Latin word 'Gladius' meaning a sword,' because of sword- like shape of its foliage. There are about 260 species of gladiolus. It has the basic chromosome number $n=15$. It is native to South Africa.

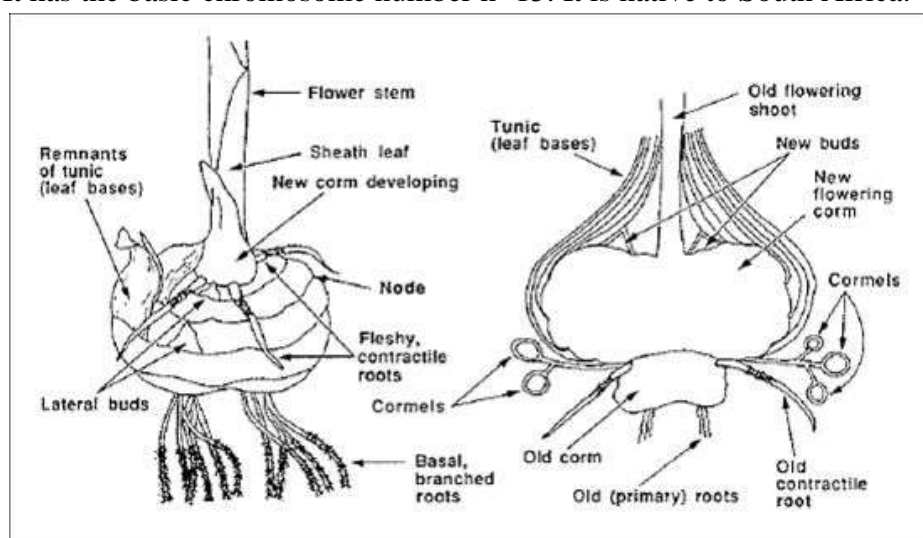


Fig: Gladiolus corm structure

IMPORTANCE AND USES

Gladiolus is an important florist crop, most popular as cut flower in the domestic and International market. In Netherlands, it ranks next only to tulip in commercial importance. It is relatively easy to grow and also suitable for bedding and exhibition. The fascinating spikes bear a large number of florets which exhibit varying sizes and forms; with smooth, ruffled, deeply crinkled or lacinated tepals. The flower spikes are used in flower arrangements, in bouquets and for indoor decoration. *grandiflorus* and *primulinus* types look very attractive in mixed flower borders. Spikes of gladiolus have good keeping quality and can be transported to long distances. Its flowers open in acropetal succession, one by one and spike lasts for 1 to 3 weeks in ordinary vase water, depending upon the season and variety.

CLASSIFICATION

Class	Characteristics
Grandiflorus or large flowered hybrids	Exhibition types, 90-150 cm long spikes
Primulinus hybrids	Less vigorous, 40-45 cm long spike
Butterfly hybrids	Spikes shorter than 45 cm
Miniature hybrids	Recent origin. 40 cm long spike, ruffled tepals
Face ups	Dwarf stem, florets are 5-6 cm wide & face upward.
Colvillei hybrids <i>G.tristis</i> X <i>G cardinalis</i>	Early flowering, suitable for green house cultivation

VARIETIES

IARI, New Delhi: Pusa Red Valentine, Pusa Subham, Pusa Kiran, Pusa Vidushi, Pusa Manmohak, Pusa Unnati, Pusa Srijana.

IHR, Bangalore: Arka Amar, Arka Naveen, Arka Gold.

NBRI, Lucknow: Neelima, Urvashi, Suverna, Roshni

GBPUAT, Pant Nagar: Subhangini

Banaras Hindu University: Malaviya Kiran, Malaviya Shatabdi, Malaviya Kundan

Other important cultivars: Sagar (fragrant variety), Dhiraj (resistant to *Fusarium* wilt), American Beauty, Pricilla, Peter Pears, Topaz, Cartago, Eurovision, Mayur.

CLIMATE

Gladioli require full exposure to sunlight for better crop, otherwise blasting may occur or plants may remain blind. The long day conditions of 12 to 14 h photoperiod increase number of florets, spike length and percentage of flowering. Low light intensity causes failure in flowering. High light intensity without proper temperature also affects growth adversely. Corm storage at 4 to 5°C is good for better growth and flower production.

SOIL

Gladioli can be grown in a wide range of soils. The soil should have proper drainage facilities. It should also contain sufficient organic matter. The soil should be sandy-loam and slightly acidic with pH 5 to 8.

PROPAGATION

Corms: Gladiolus is commercially propagated by corms. This is the commercial method for gladiolus propagation. For commercial production corm size should be 4.0 to 4.5 cm.

Large and medium sized are used for production of cut spikes, whereas small sized corms are used as planting stock for production of flower grade corms for subsequent planting seasons.

Cormels: Cormels are important source for increasing the number of good quality planting material. Cormels between 1 cm and less than 2.5 cm diameter are grown for production of flowering stock.

Seed: Seeds are used only for breeding purpose.

LAND PREPARATION

Land should be ploughed 1-2 months before at a depth of 20-30 cm. FYM or compost at the rate 5 kg/m² should be incorporated in soil and left as such. Second ploughing is done 2 weeks before planting. Weeds should be removed and phosphoric and potassium fertilizer should be incorporated before planting of corms.

PLANTING

North Western Plains – October (first fortnight)

Staggered planting can, however, be done at 10-15 day intervals from mid-August to mid-December to get continued supply of spikes over a longer period and to match the market demand. In temperate climates, the corms are planted after the winter, i.e. in March and April when frosts are over and climate becomes warm.

Only the non-dormant corms should be planted. The emergence of root buds at the base of the corms shows that the corms are ready for planting. The corms should be suitably treated with fungicides before planting. When planting, the lower portion of the corm should be placed on the soil such that the bud at the top lies straight above. It is done to make sure that the stem grows erect and does not show crooked growth. At planting time, the soil should contain

sufficient moisture to facilitate uniform sprouting of corms. The depth of planting depends more on the size of the planting materials. The medium and smaller sized corms are generally planted upto 7 cm deep while large or jumbo corms to a depth up to 15 cm. Planting is carried out during October in plains and March-April in hills. The row to row distance is normally 40 cm while plant-to-plant is 15 cm. The requirement of the corms per hectare is 1, 50,000-2, 00,000.

IRRIGATION

Gladiolus requires water in plenty but does not grow well under water-logged conditions. Frequency of irrigation depends upon the soil type, weather conditions and rainfall. Normally in sandy soils, the crop should be irrigated at 7-10 day intervals, whereas in heavy soils, at less frequent intervals. Irrigation should be withheld at least 4-6 weeks before lifting of corms.

STAKING

Especially large-flowered varieties of gladioli grown outdoors are susceptible to lodging, hence need staking. The stems should be tied with strings to thin but strong supports. Earthing up of the plants, when the spike starts elongating, also provides sufficient support to prevent lodging.

WEED CONTROL

After planting of corms, the crop requires 4-5 hoeings to keep it weed-free. The manual practice is, however, time-consuming and increases the input cost. It is, therefore, more appropriate to use chemical methods for the control of weeds. Pre-emergence herbicides reported for gladiolus are diuron (0.9 kg/ha) (or) linuron (3.0 kg/ha) and post-emergence herbicides, 2, 4-D @ 1.5-3.0 kg/ha has been found to reduce weed population.

FERTILIZATION

Nitrogen should be applied at 300 kg/ha which may be reduced in medium and heavy soils. It is applied in two doses, first at 3 leaf stage and second at 6 leaf stage. Phosphorus should be given as basal dose ranging from 150-200 kg/ha depending upon soil test. In heavy soils phosphorus application should be delayed till plants reach 2-3 leaf stage and develop good root system. Potassium imparts resistance to diseases and increases photosynthetic efficiency of leaves. Gladiolus requires around 120-150 kg potassium/ha at the time of planting of corms.

Iron deficiency is common in north-west plains of India and causes interveinal yellowing of new leaves. The deficiency is more pronounced in alkaline soils and in severe conditions emerging spikes turn light green to yellow. This can be corrected by spraying ferrous sulphate at 0.2 per cent, twice or thrice at 10 days interval.

HARVESTING OF SPIKES

Gladiolus takes 60-120 days to produce spikes. The spikes of gladiolus generally exhibit vase life of about 7-15 days. The spikes should be harvested in the morning or evening hours when temperatures are mild. Spikes should preferably be cut with sharp knives or scateurs. While harvesting, at least four basal leaves should be retained on the plant to ensure proper development of corms and cormels. The stage at which the spike is to be cut should depend upon the transportation distance, consumer requirement and prevailing temperature conditions.

HARVESTING OF CORMS

It generally takes 6-8 weeks after harvesting of spikes from the corms to become mature and ready for lifting. Plant growth stops at this stage. Irrigations should normally be withheld at least 2-3 weeks before harvesting of corms. In India, lifting of corms is carried out manually with small garden forks or 'khourpas'. After lifting the corms from the soil, the upper leafy portions should be removed by twisting and breaking the stalk. The old withering mother corms

attached to the bottom of the newly-formed corms should also be removed similarly with the thumb. The cormels should also be separated simultaneously and handled separately. The corms usually get damaged or bruised during harvesting and cleaning operations. The corms should be cleaned, dipped for 30 min in 0.3% Captan 50 WP and shade-dried at an aerated place for about 15 days. Corms are then packed in crates or in net bags and cold-stored at 4-5°C. From cold storage, these corms should be taken out one month prior to planting and kept at ambient conditions at an aerated place. The corms or cormels of different cultivars must be handled separately and labeling properly so that they do not get mixed up. Before planting, these are once again dipped for one hour in 0.3% Captan solution.

YIELD

Approximately flower spike and corm yield would be around 2-3 Lakhs/ha and 2.5-3.0 Lakhs/ha respectively depending on planting density, cultivar, corm size and management practices.

Different grades of gladiolus in International Market

Grade	Spike length (cm)	Minimum number of florets
Fancy (Blue)	>107	16
Special (Red)	96-107	15
Standard (Green)	81-96	12
Utility (Yellow)	<81	10

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