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GLADIOLUS CULTURE

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Introduction

Gladioli are among the most satisfactory summer flowers for both the amateur and the professional grower. They are useful as cut flowers in decorating the home and are frequently used by florists in making sprays, bouquets and corsages. Gladioli reach their highest perfection as exhibits in flower shows. They also are attractive in the garden planted in beds or in borders, in combination with other plants.

History

The gladiolus has been called the "King of Flowers." Its Latin name means little dagger, referring possibly also to the gladiators of old, and its sword-shaped leaf gave it the name sword lily. The early Greeks and Romans knew gladioli as corn lilies or corn flags, for they were found growing wild in their corn fields. Those species are small and lacking in color.

The great majority of gladiolus species originated in the vicinity of the Cape of Good Hope, South Africa. During the 17th and 18th centuries, gladioli were introduced into Europe and America. Plant breeders have been endeavoring ever since to improve them by crossing and hybridizing.

Botany

The gladiolus is a monocotyledonous plant of the family Iridaceae, which includes iris, crocus and tigridia. The leaves are sword-shaped, erect, long, and narrow, borne from opposite sides of a short stem near the ground. The flowers appear on long terminal spikes, composed of leafy bracts, which bloom in one-sided clusters from the lower part upward. The numerous flowers are large, irregular, funnel-shaped, variously colored and noteworthy for a long pistil having a 3-forked stigma.

At the end of the growing season, one or more corms or fleshy bulbs are produced underground at the base of the stem, immediately above the old corm (Fig. 1). Cormels, or small corms, also develop around the base of the new corm. These are storage organs and are the means of perpetuating the variety.

Seeds are produced after fertilization of the ovules of the flowers. The seeds are encased in a pod or capsule which splits as soon as they mature. Seeds are the means of propagating the species, and are the source of new varieties, sought by those interested in improving gladioli. Seeds ordinarily are not

allowed to develop because they draw on the reserve food supply and prevent growth of the corm and cormels.

Sports or mutations, which are sudden departures from the parent plant, rarely appear, but if they do, may be propagated by means of corms or cormels.

Varieties

There are about 10,000 varieties of gladioli, exhibiting almost every color known. Through the work of early breeders and the results of scientific modern hybridizing, many colors including white, pink, red, crimson, scarlet, orange, yellow, purple and violet, and variations of every hue have been produced.

Any list of varieties is always open to argument. It depends largely upon one's personal preference. The following varieties may be considered popular at present and are listed with the country of origin and color:

Picardy (Canada) - salmon pink
Minuet (United States) - lavender
Betty Nuthall (United States) - salmon pink
Pfitzer's Triumph (Germany) - scarlet
Albatross (Germany) - white
Mrs. Leon Douglas (United States) - salmon pink
Golden Dream (Canada) - yellow
Bagdad (Canada) - smoky rose
Pelegrina (Germany) - dark violet

Growing Gladioli

Propagation

Gladioli are propagated from corms, cormels and seed. The seed is used only by those engaged in growing new types. It requires usually two years for seeds to produce blooms, although with good culture, blooms may be had the first year. Cormels ordinarily bloom the second year and very frequently the first. Corms, of course, produce flowers the same season they are planted.

Harvesting and Storage

The gladiolus plants are dug at the end of the growing season after the foliage yellows and dries, thus indicating that the corm has received most of its food supply and that growth has ceased. If the foliage does not have the appearance of maturity, the plants should be permitted to remain in the ground as long as possible. The plants should be dug before there is danger of freezing in the soil, however, and before the soil becomes excessively wet. The soil is loosened with a potato-fork or a spade and then the plants are pulled carefully by the tops, and placed in piles with the varieties kept separate. Some prefer to cut off the leaves a few inches above the corm just before or soon after digging, while others believe that the tops should remain on during the early stages of storing. It seems desirable to allow all the storage material in the leaves to accumulate in the corm before the tops are cut away. The plants are taken as soon as convenient to a well ventilated, fairly dry and cool place. Some commercial growers use artificial driers (80° to 90° F.), such as prune dehydrators, for quick drying of the dug plants and corms. The stalk should be cut off a few inches above the corm and should be destroyed by burning, to decrease the chances of carrying over diseases and insect pests.

Further drying of the corms will be necessary, requiring a month or more. The corms should be spread on shallow boxes or trays with wire or slat bottoms to assure abundant and efficient ventilation and to facilitate drying. The bulbs should be turned every day, a procedure which seems to decrease the chances of rotting. As the curing progresses the old corm roots, the new corms and the cormels may easily be separated (Fig. 2). When sufficiently dry the corms should be stored until the next season, by placing them, according to variety, in open trays or paper bags in a dark, cool, fairly dry, well ventilated storage place, a temperature between 35° and 50°F. being optimum. Mixing the dried corms with dry sand, soil, shavings or similar material aids in insuring proper storage conditions. As a means of controlling gladiolus thrips, naphthalene flakes should be sprinkled over and around the corms, one ounce to every 100 corms, covering the containers to insure contact of the gas for two or three weeks during winter storage, but not in the spring.

Cormels are produced in numbers around the base of each new corm, and are used to propagate the variety. Cormels may be stored in a manner similar as that for corms. It is not always possible to obtain good germination by cormels without soaking in water about 48 hours, or peeling, or scarifying by rasping them with a file, before planting.

Seed, if used, should be gathered as soon as the seed pods crack from the top downward. Seed should be dried and stored in cloth bags until planted.

Sources and Ordering

The gladiolus is being propagated by specialists in various parts of the country. Visits to growers' plots, flower shows, and reference to florist and nursery magazines keep one up to date on the qualities of new varieties. One should obtain catalogs early in the fall, decide on varieties, and place orders during the winter months to be sure of obtaining the desired kinds before the stock is sold out. The best sizes are between 1 1/4 and 1 1/2 inches in diameter, round and usually plump rather than flat. It is advisable, occasionally, to obtain new stock, because of poor propagation or storage methods. Likewise, new corms, grown from cormels, may be better than corms taken from one's own plants year after year.

Site and Soil

A sunny location is essential for the gladiolus. A cool, humid, well aerated place is most desirable as a planting area. Protection from strong winds should be sought by use of other plants or windbreaks. There should be no frost pockets or poorly drained places in the planting area. A change of location is desirable every year in order to reduce disease and insect pests which may carry over in the same soil year after year.

The soil should be well drained and fertile, and easily worked to a depth of at least a foot. A light sandy loam is preferable to the heavy clay types. Decayed organic matter and phosphate fertilizers appear advantageous for application during the growing season. Irrigation may be necessary with either surface or overhead watering systems.

Time and Manner of Planting

One should keep in mind that gladioli bloom the same season they are planted, provided large (1 1/4"-1 1/2") corms are used. The time of blooming varies between 70 and 90 days from the time of planting.(1) For early flowers, early planting is necessary; and, for late flowers, planting later in the spring is recommended. Location, variety and seasonal conditions, however, must be taken into consideration.

Planting time varies from April to the middle of June, according to when the blooms are wanted. Some growers plant at weekly intervals, thus giving a succession of flowers throughout the summer and fall months. The time of planting should not be delayed so late that the flowers will be spoiled by fall rains or early fall frosts. With a little experience, one becomes acquainted with the variety and season of blooming under his particular conditions and will be guided by that.

Assuming that the ground is well prepared by previous deep cultivation, the corms are set in beds or rows in such places as perennial borders, around the garden, or in the open field.(2)

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(1) The following varieties planted at Corvallis from the middle to the latter part of June produced blooms on the days given below:

	Bloomed 1937	Bloomed 1938
Libelle - lavender	Sept. 15	August 31
Mary Pickford - white and yellow	Sept. 9	Sept. 1
Betty Nuthall - pink	Oct. 13 again Nov. 1	Sept. 5
Golden Cup - yellow	Sept. 29	Sept. 6
Tip Top - scarlet	Sept. 21	Sept. 10
Purple Glory - purple	---	Sept. 12
Bagdad - smoky old rose	Oct. 21	Sept. 14
Picardy - shrimp pink	Oct. 9	Sept. 14
Virginia - scarlet red	---	Sept. 16
Pfitzer's Triumph - salmon orange	---	Sept. 25
Mrs. Leon Douglas - pink	Oct. 7	Sept. 25
W. H. Phipps - pink	---	Oct. 1

(2) Classification of gladioli according to blooming time from planting:

Early	Early midseason	Midseason	Late midseason	Late
Pelegrina	Mary Pickford	Golden Cup	Albatross	W. H. Phipps
	Libelle	Tiptop	Betty Nuthall	
		Purple Glory		
		Picardy		
		Virginia		
		Mrs. Leon Douglas		
		Pfitzer's Triumph		
		Salbach's Orchid		

The corms may be planted in individual holes dug with a trowel, or in furrows. Corms are planted about 4 to 6 inches deep, but if cormels or small corms are used, they are planted only 2 to 3 inches deep. Large corms should be set 8 inches apart, and smaller corms 4 to 6 inches apart. Cormels may be put in thickly if a quantity are planted. Even where planted an inch apart they frequently bloom and give large bulbs. Rows may be 20 to 42 inches apart, depending upon whether hand, horse or tractor drawn implements are used. In the garden, the rows should be far enough apart to admit free and intensive cultivation. Staggering the plants in double rows conserves space when the area is limited. The corms should be pressed lightly in the bottom of the furrow or hole in an upright position, that is, pointed-end up, and the old corm-scar down; those that are sprouting should be planted with the sprout up (Fig. 3). They should be covered with finely pulverized soil, pressed firmly on top.

Cultivation

Gladioli require a constant supply of moisture. If the soil is dry at planting time, irrigation should be given them to start germination and growth without delay. In about two or three weeks the gladioli will be up. Occasional heavy irrigation is beneficial in promoting the best growth of the plants. Cultivation will be advisable to break up the crust, allow aeration and maintain moisture by keeping down weeds. When plants are 6 inches tall, the first application of fertilizer may be made to the ground around the plants, using bone meal, phosphate, or complete chemical fertilizer or liquid or other manure, at the rate of 1/4 to 1/2 pound to every 100 feet of row. Be careful to keep fertilizer off the foliage. Trial applications will indicate which kind may be best with the particular soil. Repeated applications may be given every 10 days to 2 weeks until the plants begin to bloom.

Diseases

Gladioli may die during the summer due to diseased corms or to soil infection. This may be partly avoided by treating the corms with a mercury compound just before planting. One ounce mercuric chloride to $7\frac{1}{2}$ gallons of water for 6 to 10 hours is recommended. Cutting out slightly diseased parts and disinfecting the corms may aid in the control of these troubles. It may be more advisable, however, to destroy infected corms or plants as soon as they are discovered.

Insects

Of the insects that infest gladioli, thrips is the most common. This insect causes spots and streaks on the leaves and occasionally on the flowers on which it feeds. Control may be effected by spraying the foliage with a mixture of Paris Green 1 ounce, brown sugar 2 pounds, dissolved in 3 gallons of water. Application should begin when the plants are small and continue until the bloom appears, using a fine mist spray from an atomizer or spray machine. The insect travels down the plant to the corm where it spends the winter. It may be controlled by fumigating the corms in storage by using naphthalene flakes scattered over the corms, 1 ounce to 100 corms. (Oregon Extension Circular 144 "Gladiolus Corm Treatment for Thrips and Disease Control.")

Cutting the Blooms

Gladioli are most satisfactory as cut flowers. They may be kept attractive indoors for a week or more. The spike should be cut when the first flowers appear, using a sharp, thin-bladed knife, and cutting so as not to leave more than four or five leaves attached above the cut. Spikes should be placed with their butt ends in cold fresh water without delay, and then placed temporarily in a cool dark place until ready for display. They should be placed in deep water in a tall container so they can absorb as much water as they need. They may be displayed in baskets, vases, bowls or similar containers, changing the water and making a fresh cut on the butt ends of the spikes every day. Gladioli spikes may also be shipped long distances satisfactorily provided a little care is exercised in packing them.

Newer Varieties[1]

Aida (Pf), early deep blue
Albatross (Pf), large pure white
Bagdad (Pal), tall smoky rose
Berty Snow (Mair), large lavender
Betty Nuthall (Salb), coral with orange throat
Blue Admiral (Christ), deep violet blue
Champlain (Pal), soft violet blue
Commander Koehl (Pf), huge dark scarlet
Dr. Bennett (D), orange scarlet
Golden Cup (Pal), deep yellow
Joseph Haydn (Pf), light violet with beautiful dark violet blotch
Libelle (Pf), light blue
Max Reger (Pf), fine light lavender blue
Milford (NZ), clear azure blue
Pelegrina (Pf), deep blue
Pfitzer's Masterpiece (Pf), salmon pink with cream blotch
Pfitzer's Triumph (Pf), large orange
Picardy (Pal), shrimp pink
Pirate (Pal), carmine and purple
Veilchenblau (Pf), violet blue

Newest Varieties[2]

Amrita (Pal), buff ruffled
Atlas (Pf), early dark, blue violet
Barcarolle (Pal), orange ruffled
Black Opal (Errey), black red
Carrillon (Pal), rose pink with white throat
Changeable Silk (B), rose pink with blue sheen
Hindenberg's Memory (Pf), large red
Ivory Keys (Ellis), large tall cream
Matterhorn (Pf), large white
Sherlock Holmes (P), brilliant orange red
Snow Princess (Pf), creamy white
Thistle Dew (W), ruffled light pink
Yellow Peril (Ellis), deep yellow

Originator's or introducer's name appears in parenthesis after the name of variety: (Pf) Pfitzer; (Pal) Palmer; (Salb) Salbach; (D) Richard Diener; (NZ) from New Zealand; (B) Baerman; (P) Prestgard; (W) Windsor.

Descriptive List of Choice Varieties[3]

Aachen (Mitsch, 1937). A beautiful, daintily ruffled, lustrous cream glad. A Picardy seedling.
Alayne (Kinyon). Beautiful new shade of light rose. Blooms somewhat ruffled and all face one way.
Allegro (Pfitzer). Light lavender blue with dark blue blotch.
Allemania (Pfitzer). A light bright scarlet.

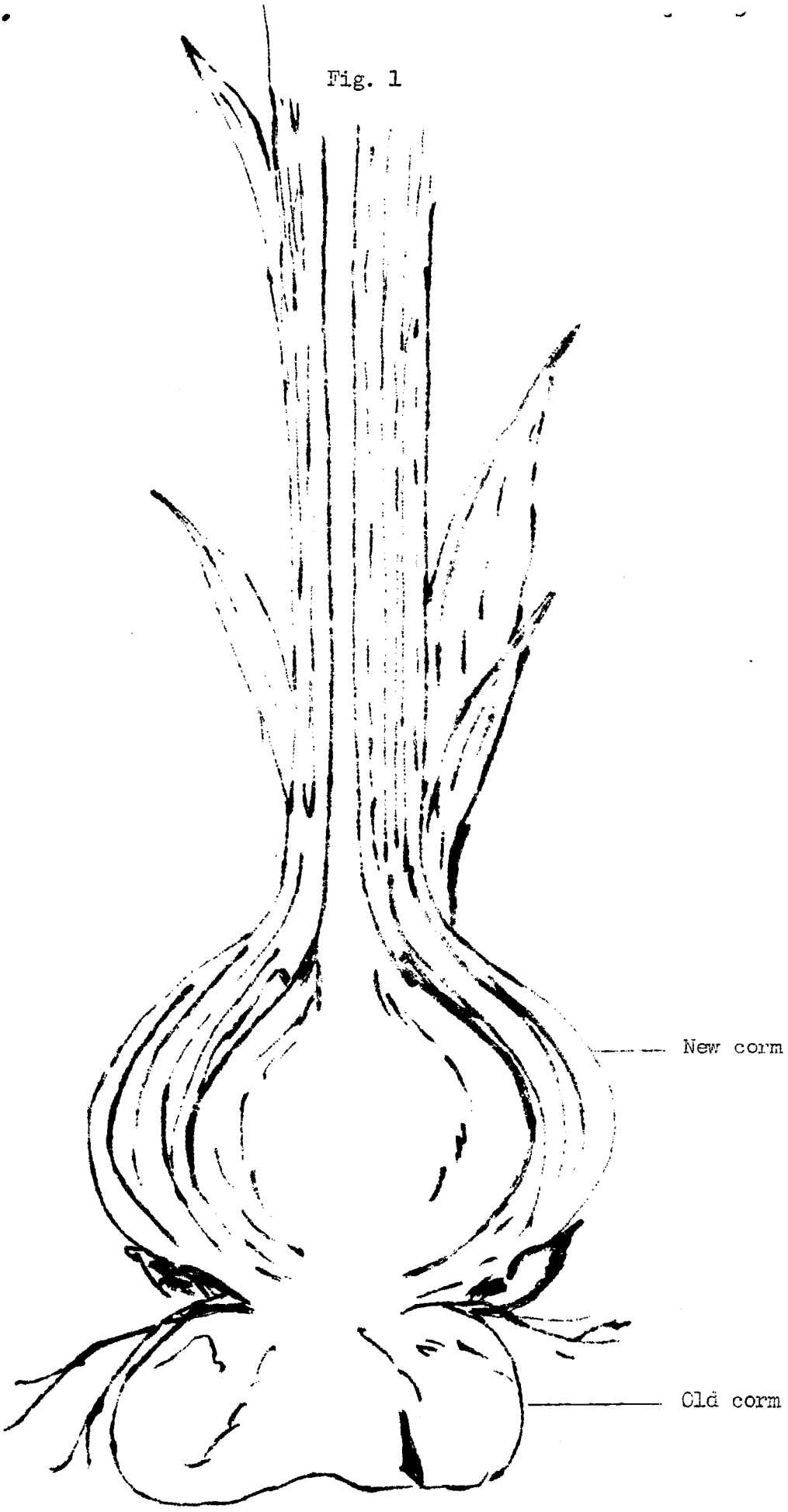
(1) Taken from 1938-39 list of L. E. Weeks Gladiolus Gardens, Salem, Oregon.
(2) Suggested June, 1939, by Grant E. Mitsch, gladiolus grower and hybridist, Lebanon, Oregon.
(3) Taken from 1938 catalog of Riverview Gardens, St. Paul, Minn.

Blue Admiral (Christ). Tall, straight-growing variety. Color a dark blue.
Bonnie Blue (Christ, 1936). Large, light blue.
Conquest (Mitsch, 1937). Light salmon-pink with cream throat blotches.
D. A. Hay (Whiteley). A pleasing shade of pink with a cream white throat.
Del Ray (Burtner). A tall, light red with a beautiful clear white throat.
Do K (Pfitzer). Amber yellow with two lobe petals sulphur to almost gold.
Indian Princess (Zimmer, 1937). Decorative tall tyrian rose. Heavily ruffled.
Johann S. Bach (Pfitzer). Color fine orange salmon, somewhat lighter in the throat, with median lines on each petal.
Madame Schumann-Heink (Diener). The color is the brightest shade of lavender imaginable with a dark lavender line in the throat.
Milford (Rides). A clear azure blue with inconspicuous throat markings.
Miss New Zealand (Mrs. Julyan). Apricot-salmon, suffused with rose, distinctive throat blotch of the coloring of a ripe peach.
Pensacola (Christ, 1935). A pure blazing scarlet red with the earmarks of a champion; blotched with darkest red, nearly black.
Robert Burns (Christ, 1935). Color slightly lighter than Pelegrina, but nearer to real blue than any other glad that we have ever seen.
Shirley Temple (Pruitt). Color cream with richer cream throat. Heavy substance and beautifully ruffled.
Tip Top (Pfitzer). The color is a brilliant scarlet with a darker feather in the throat.
Southern Cross (Whiteley). One of the finest and deepest reds.
Vagabond Prince (Palmer). An unusual iridescent garnet brown, lighter in upper throat and with a small blotch of glowing flame scarlet on lip petal.

References

Garden Bulbs in Color. McFarland, J. H. and others. The Macmillan Co., New York. 1938.
Gladiolus. F. F. Rockwell. The Macmillan Company, New York. 1927.
The Gladiolus Book. McLean, F. T., Clark, W. E., Fischer, E. N. Doubleday, Page & Company 1927.
Gladiolus Culture. Shoemaker, J. S., and Adamson, R. M. Bul. 27, Univ. of Alberta, Col. of Agr., Edmonton, Alberta, Canada. 1937.
Gladiolus Studies. Ext. Bul. 10, N.Y. State Col. of Agr. 1916.

Fig. 1



Corm Formation During Growing Season

Fig. 2

Gladiolus Corm with Cormels at End of Season

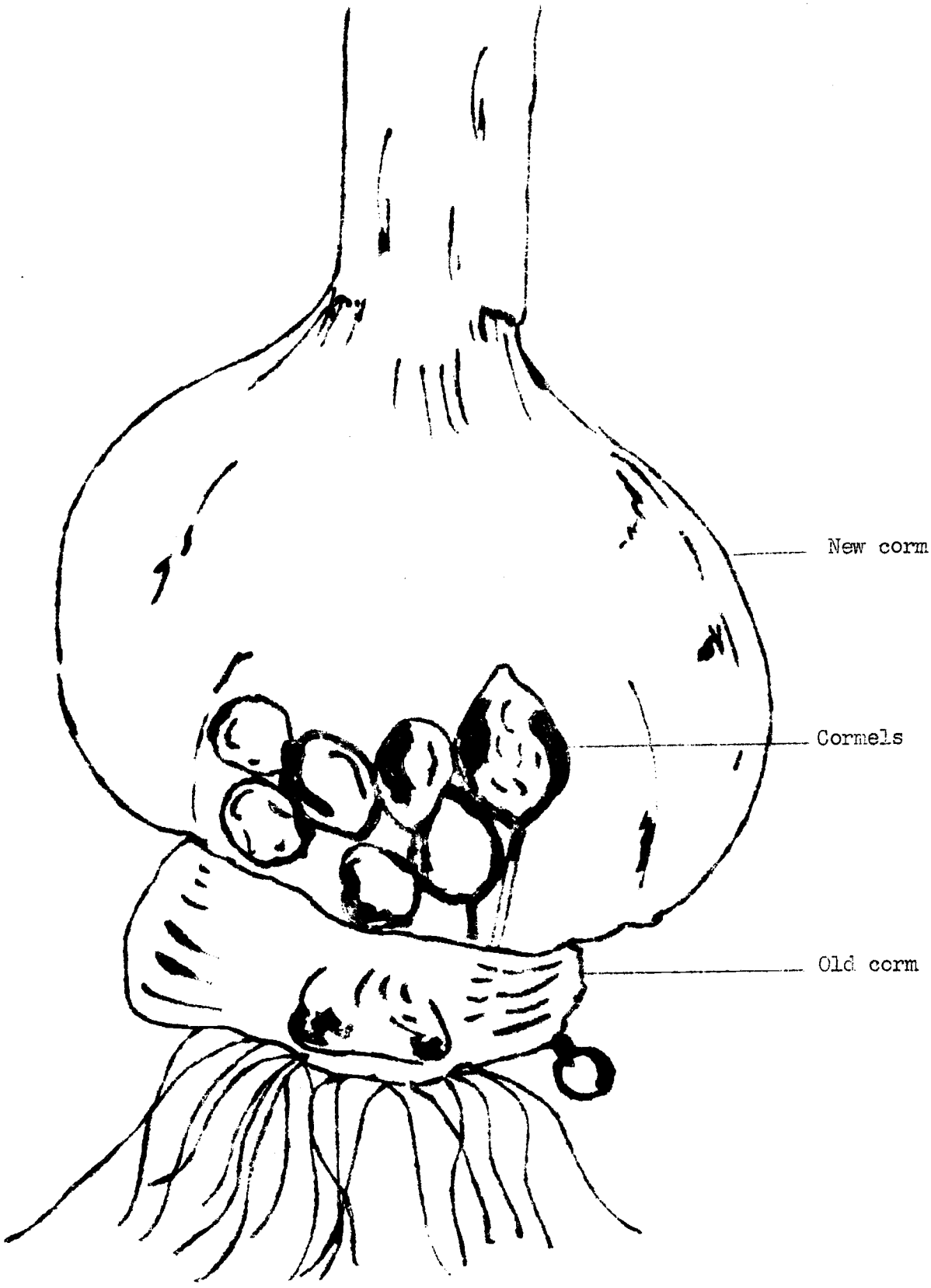
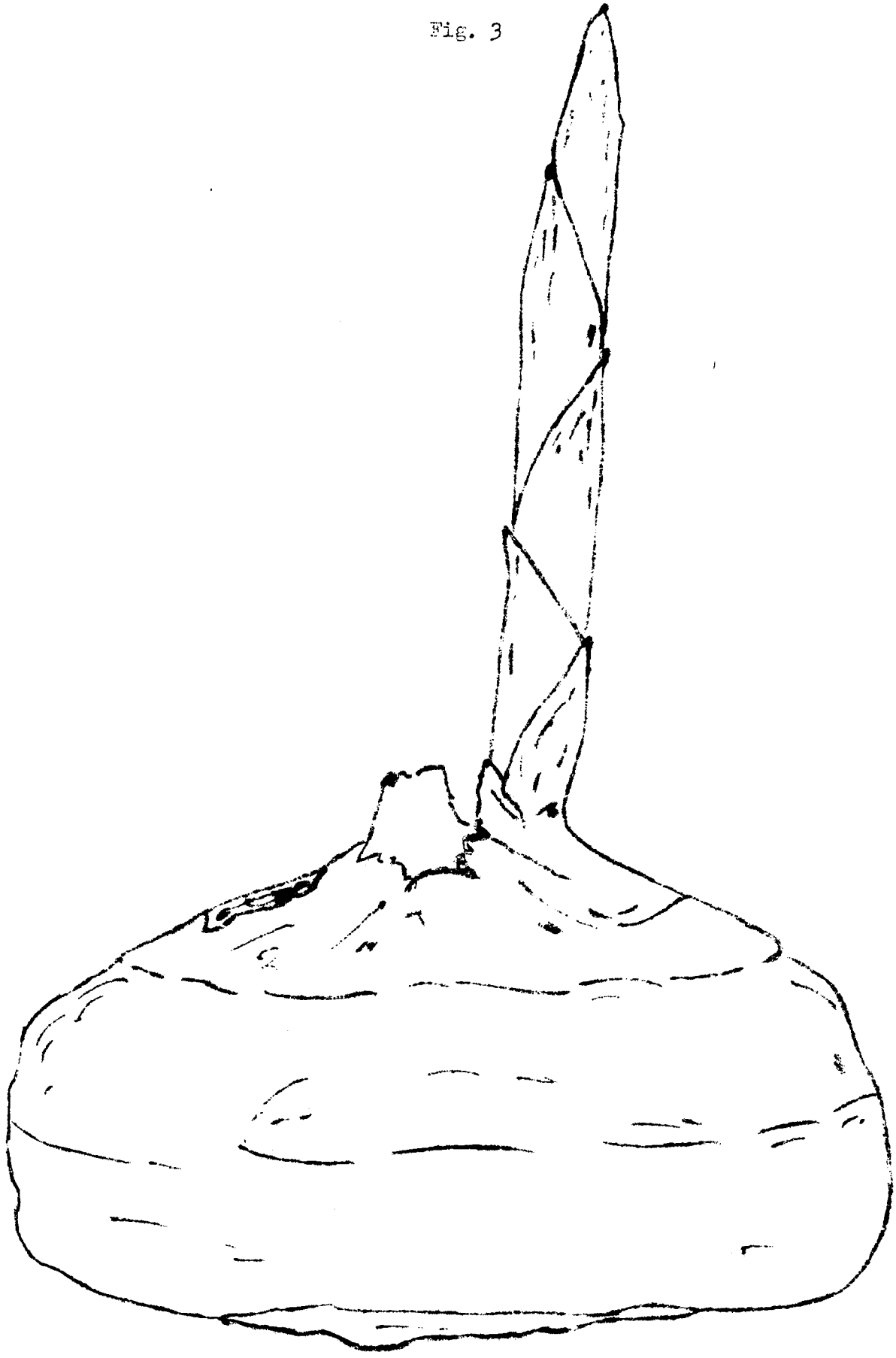


Fig. 3



Sprouting Corm