



Advances in bulb crops

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Received: 27-May-2022, Manuscript No. AAPBH-22-65063; **Editor assigned:** 30-May-2022, Pre QC No. AAPBH-22-65063 (PQ); **Reviewed:** 13-Jun-2022, QC No. AAPBH-22-65063; **Revised:** 20-Jun-2022, Manuscript No. AAPBH-22-65063 (R); **Published:** 28-Jun-2022, DOI: 10.51268/2736-1802.22.10.088.

DESCRIPTION

In botany, a bulb is materially a short stem with fleshy leaves or leaf bottoms that function as food storage organs during dormancy (In gardening, plants with other kinds of stowage organ are also called "ornamental bulbous plants" or just "bulbs").

The bulb's leaf bottoms, also known as scales, generally do not support leaves, but carry food reserves to enable the plant to get through adverse conditions. At the centre of the bulb is a vegetative growing point or a contracted flowering shoot. The bottom is formed by a reduced stem, and plant growth occurs from this bottom plate. Roots crop up from the underside of the base, and new stems and leaves from the upper-side. Species in the genera *Allium*, *Hippeastrum*, *Narcissus*, and *Tulipa* all have tunicate bulbs. Non-tunicate bulbs, such as *Lilium* and *Fritillaria* species, lack the protective tunic and have looser scales.

Bulbous plant species cycle through vegetative and reproductive maturation stages; the bulb grows to flowering size during the vegetative stage and the plant flowers during the generative stage. Certain environmental conditions are needed to activate the transition from one stage to the next, such as the shift from a cold winter to spring. Once the flowering stage is over, the plant enters a vegetation period of about six weeks during which time the plant absorbs nutrients from the soil and energy from the sun for setting flowers for the next year. Bulbs dug up before the vegetation period is completed will not bloom the following year but then should flower generally in subsequent years.

Nearly all plants that form true bulbs are monocotyledons, and contain:

- *Crinum*, *Hippeastrum*, *Narcissus*, and various other members of the *Amaryllis* family *Amaryllidaceae*. This contains onion, garlic, and other alliums, members of the *Amaryllid* subfamily *Allioideae*.
- Lily, tulip, and many other members of the lily family *Liliaceae*.
- Two groups of *Iris* species, family *Iridaceae*: subgenus *Xiphium* (the "Dutch" irises) and subgenus *Hermodactyloides* (the miniature "rock garden" irises).

Oxalis, in the family *Oxalidaceae*, is the only dicotyledon genus that generates true bulbs. Some lilies, like the tiger lily (*Lilium lancifolium*), form small bulbs, called bulbils, in their leaf axils. Several members of the onion family, *Alliaceae*, including *Allium sativum* (garlic), form bulbils in their flower heads, sometimes as the flowers dim, or even alternative of the flowers (which is a form of apomixis). The so-called tree onion (*Allium × proliferum*) forms small onions which are good enough for pickling. Genetic development is one mechanism to address those challenges. Recent research for screening bulbs for *Fusarium* basal rot resistance has resulted in improved screening techniques and germplasm exhibiting less disease when immunize with the disease-causing pathogen. Improved screening methods have resulted in germplasm revealing fewer and less severe *Iris* yellow spot manifestation when onion thrips and conducive environmental conditions are present.

CONCLUSION

Typical breeding efforts and genetic direction of the genes producing alliinase and lachrymatory factor hydroxylase has resulted in low pungency. In long-day, a yearly generation time has been achieved by unnatural breaking bulb dormancy

early while verifying proper vernalization has been ended. Genetic development of traits will carry on with and result in better production in the future.