**Gossypium spp. - a new ornamental plant use for indoor and flower arrangements**

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**Abstract** The diversification and introduction of new plants in floriculture and ornamental horticulture is an important objective of our researches in order to diversify the Romania assortment for indoor design and floristiq art. Diversifying the assortment of ornamental plants by introducing exotic species is an actual objective of growers worldwide. In Romania we are lately witnessing to the importation of ornamental plants less known, but which are a great interest in terms of ornamentation. This requires knowledge of environmental conditions and culture technology so that the plants could be grown with good results. In this paper was presented cotton (*Gossypium spp*.), including around 50 cultivated not only for natural fibres, for oilseed crop source for animal feed and medicine use as also for indoor design as pot plant or different arrangements. *Gossypium hirsutum* species is being taken in culture for ornamental value. It is a species of great beauty with spectacular inflorescences, and its leaves complement the decorative value.

**Key words** houseplant, pot plant, characteristics, techniques, assortment, diversification

Flowers and ornamental plants are as important economic activities in the Romania economy. The flower market constantly demands novelties and new varieties and, in the last years, the market for tropical flowers has been growing mainly due to the exotic beauty of these species. In this context, cotton emerges as a very interesting alternative with very differentiated and original characteristics and multiple design possibilities. An important objective of our researches is to improve the assortment for indoor and to find the best plants and novelties for arrangements.

With the introduction of a wide variety of plants and knowledge of the possibilities of successful cultivation, growing houseplants became one of the most popular hobbies. If before growing species brought from different areas were the exclusive prerogative of the rich, it became accessible to all [8].

Aesthetic qualities of flowers are exploited deliberately by humans, so they are used to decorate the inside of homes and jobs grown as pots plants or either as cut flowers being the main attractions and joy to the viewer. Created by the harmonious combination of decorative indoor plants is a well known educative role. Due to their aesthetic quality, colors affect human mental state.

Apartment plants can have beneficial effects on life. They purify and renew the indoor air by filtering out toxins, pollutants and carbon dioxide we exhale, replacing them with oxygen, so much needed to life. For this reason this paper presents a new tropical plant belong to *Gossypium* genus with real possibilities of spreading in our interiors.

**Origin and History of Genus Gossypium**

Cotton (*Gossypium* spp.) grows as a perennial shrub but is typically kept as an annual. *Gossypium* is the cotton genus. It belongs to the tribe *Gossypieae*, in the mallow family, Malvaceae, native to the tropical and subtropical regions (Central America, Mexico, Hawaii, Australia, Southern Africa, India etc). Genus *Gossypium* comprises around 50 species and new species continue to be discovered [5]. The name of the genus is derived from the Arabic word *goz*, which refers to a soft substance [3]. The generic name *Gossypium* is derived from the Greek name for cotton, *gosypion*. The specific epithet *tomentosum* from the Latin *tomentosus* or tomentose, meaning “covered with tangleed or matted, woolly hairs.”

The origin of the genus *Gossypium* is dated to around 5-10 million years ago [1]. Ancient writings attest that India was the first center of culture and cotton-processing. Archaeological excavations on the banks of the Indus revealed fabrics of cotton, an extraordinary finesse, made over 3000 years BC From there it spread in many other parts of the world. In Egypt, cotton had primary culture for 2-3 centuries BC
Moors spread plant in northern Africa and southern Europe (IX-X century AD). Another origin is the center of America. Columbus landing in the new continent (1492), found natives wearing clothes made of linen with cotton. Aztecs and Maya tribes knew wonderful crafts to color fabrics. In time cotton became the most important textile plant.

Cultivation of this species dates back to prehistoric times; continents began to cultivate are America, Africa and Asia. Of the 50 species that make up the genus, only 4 were grown. Two diploid species of the genus (Gossypium herbaceum L. and Gossypium arboreum L.) are characterized by a thick and short fiber and two species Gossypium barbadense - cotton which manufacturer long Egyptian fibers and Gossypium hirsutum - producer intermediate cotton fibers. So far, Gossypium hirsutum is the most cultivated species of cotton. Over 94% of the world's cotton is produced by this species. In USA the next states grow cotton: Alabama, Arizona, Arkansas, Mississippi, Louisiana, North Carolina, Oklahoma, Kansas, New Mexico, Georgia, Tennessee, Texas and Virginia.

Plant Description

As a perennial, upland cotton will become a large shrub-like herb anywhere from 1–2 m high in modern cropping systems, sometimes higher in traditional, multianual cropping systems, now largely disappearing, in culture smaller. The leaves are broad and lobed, with three to five (or rarely seven) lobes. The seeds are contained in a capsule called a "boll", each seed surrounded by fibers of two types. These fibers are the more commercially interesting part of the plant and they are separated from the seed by a process called ginning. At the first ginning, the longer fibers, called staples, are removed and these are twisted together to form yarn for making thread and weaving into high quality textiles. At the second ginning, the shorter fibers, called "linters", are removed, and these are woven into lower quality textiles (which include the eponymous Lint) [10].

The first floral bud occurs on the 7-9th node approximately 35–40 days postemergence; 20-25 additional days elapse until anthesis. Floral parts are morphologically well defined by two weeks preanthesis (Fig. 1). In about 85 % of the flowers the basal, abaxial surface of two of the three bracts contains an outer involucral nectary; occasionally, none, one, or three nectaries are found. The maximum rate of increase in floral bud length occurs during the 24 hrs preceding anthesis. Flower opening occurs at about daylight, although light is not required.

Multipored pollen grains germinate in about 1/2 hr after deposition on the stigmatic hairs. Fertilization is accomplished, for most ovules, by the end of the first day postanthesis. Stomata are abundant, particularly at the chalazal ends of ovules. Fiber initials (epidermal cells of the ovule) begin their elongation phase on the morning of anthesis and are bounded by a thin primary wall. Areas of contrast (spots) observed through the scanning electron microscope are speculated to be organelles "seen through" the relatively amorphous fiber wall, which lacks extensive fibrillar orientation of cellulose. Fiber elongation ceases by about 24-28 days postanthesis, and by 50-70 days postanthesis fibers are mature and exhibit a thickened secondary wall and spiral twisting. Concomitant with the time of fiber maturity, the ovary wall splits and opens along locular suture lines [11].

Related to the beautiful hibiscus, cotton produces large, showy flowers in mid-summer, making it an attractive indoor container specimen. Cotton plants blossom continually for 3 to 5 weeks, with flowers each lasting about 2 or 3 days. Brown fruit capsules called bolls develop by late August as blooms die off. The fluffy seed pods burst open when they're mature and the cotton is ready for harvest in September (Fig.1).

Cotton fibers occur naturally in colours of white, brown, green, and some mixing of these.
Species of Gossypium

Of the approximately 50 species and of the genus Gossypium more important are [10]:
- *Gossypium arboreum* L. - tree cotton (India and Pakistan)
- *Gossypium herbaceum* L. - levant cotton (southern Africa and Arabian Peninsula)
- *Gossypium raimondii* Ulbr. - one of the putative progenitor species of tetraploid cotton, alongside *G. arboreum*
- *Gossypium barbadense* L. - Creole cotton (South America)
- *Gossypium hirsutum* L. - Upland cotton (Central America, Mexico, Caribbean and Florida)
- *Gossypium tomentosum* Nutt. ex Par – Maó or Hawaiian cotton (Hawaii)
- *Gossypium F. Muell* - (northwestern Australia)
- *Gossypium sturtianum* JH Willis - Sturt's desert rose (Australia).

Biology and ecological requirements of *Gossypium hirsutum*

Temperature and Light

Cotton is demanding from heat. Minimum temperature for germination is 12°C. It is grow and fructify better at an optimal temperature of 20 – 28°C. It is sensitive to low temperatures. Plants suffering from cold in late spring or early autumn. Required an amount of active temperatures 4000 - 4800°C. Being a demanding plant against light needs 1500 hours of sunshine. Cotton seeds will germinate and will come in about 5-10 days. Previous research has shown the close relationship between temperature and boll development [4; 2].

Watering

The amount of water and frequency of watering is directing depending on the species and within species depending on phenophase, age, season, health. The rule is to wet with plenty of water. Water temperature used for watering should be the same as the environment in which the plants are. Importance is water quality and water pH. To save water applied culture mulching, shading, soil loosening and weed control.

Has a high water consumption, with higher demands during flowering, when consumed 60-90 cubic m / ha / day. Plant needs of rainfall, 500-800 mm annually. It is resistant to drought.

Soil

Prefer soils with medium texture, clay-sandy, well-structured, deep, homogeneous, with average fertility and pH 6-8. Root systems, highly branched, deep, sometimes up to over 2 m. Most roots are found scattered to the depth 25-30 cm depth.

Fertilizers

Fertilizer demand is estimated depending on the species, age and stage of vegetation growth rate, organs decorative, season in which plants grows, physio-chemical qualities of the substrate soil. Plant nutrition must be high, especially during in the period of fruit formation.

Propagation and cultivation

Early production of raw cotton is obtained if they meet one rotation after maize, cereals, beets, tobacco, and sunflower. Avoid fields with weeds.

Soil preparation is similar in all cultures watering, fertilizing with manure 20 t/ha and phosphorus and potassium fertilizers incorporated into autumn plowing. Nitrogen applied in spring from 40 to 80 kg/ha before sowing. Summer plowing runs after crop harvested in July-August and late autumn after the (corn) at a depth of 25-30 cm. Seedbed is working in March with disc harrow and preemergent herbicides applied with this occasion.

Seeding. Use different varieties (Brânceni), which are sown between 20 to 30 April when the ground is 12°C. We recommend 30-40 kg/ha seeds, which is inserted into the soil to a depth of 3-5 cm, ensuring 160-180 thousand plants harvested per hectare. Distance between rows is 60 cm and 10 cm between plants. Sowing can be done with SPC-8.

Harvesting. Consists of two phases:
- hasten ripening by chemical treatments Flordimex at early opening capsules of cotton
- deflower using preparation Butrifox that prepare the plantation for harvest expected.

- actual harvest: manual, when 25-30% of the capsules were opened and mechanized combines 14HV-2, 4, when 65% of the capsules were opened.

Production varies between 800-1000 kg / ha raw cotton from which fiber is 30-35%, depending on the ecological, soil type and technology applied strictly Plant Care is doing work on the land: removing crust, mechanical weeding 1-3 and a manual. Irrigation is recommended in dry years with 500-700 m³/ha, if worse soil water deficit during the formation of flowers and fruit. Pest and disease control must be in focus grower. Diseases (bacterioza or gomoza and rot seedlings) are destroyed by treatment of seeds and pests (aphids and trips) with pesticides at the first true leaf.

Uses

Although a specific culture ecological areas in Mexico, Central America, Central Asia, China, India, cotton was introduced in Romania, where he adapted well. Is the most valuable textile plant with multiple uses: fine textile, artificial silk, accessories for electronics, furniture, carpets and pulp industry. Seed oil (20-27%) is poor drying and used in industry.

Cotton for cloth manufacturing is obtained from the fuzzy seed coating found in the fruit or capsules. Four species are used commercially cotton species with the Upland cotton (*Gossypium hirsutum*) generating about 90% of industry use, and American
Pima or Sea island cotton (G. barbadense) with 8%–both naturalized species in Hawaii. The remaining 2% between two other species (G. arboreum, G. herbaceum) [10]. Apparently, the fibers were also used for medicinal applications much as a cotton swab would be used today.

For severe stomach cramps, the dried flowers were eaten along with other plants while also drinking a tea made with ma’o bark and other plants [6]. The flowers and bark of tap roots mixed with other ingredients were used to treat gripping stomach aches, such as during childbirth.

The flowers were sun dried and eaten. Other plant parts were made into a liquid for consumption. Flowers make an extremely important contribution to creating a positive ambience in any event: wedding, christening, birthday, party or any other event.

Floral arrangement is not necessarily an art reserved only for special occasions, a few flowers placed on a kitchen table can be as important, in a way, like a floral decoration in an important event.

Gossypium hirsutum flowers of the species can be performed equally fresh flowers, dried flowers or even artificial flowers (Fig. 2).

Conclusions

Taken into consideration the different Cotton plants characteristics this plant can be easily incorporated in indoor design or can use for different arrangements.

The inclusion of cotton on cultivation may contribute to diversification of floriculture and valorization of new species.

Houseplants can have beneficial effects on life. They purify and renew indoor air, filtering toxins, pollutants and carbon dioxide you exhale, replacing them with much needed oxygen life.

This species could be a valuable new flower product.

References