



# The Study of the Morphobiological Properties of Tomatoes

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## ABSTRACT

Tomato fruit - a multi-celled, multi-seeded, fleshy berry. Fruits vary in weight: from 20-50 g to 500-800 g. Weight is small to 70 g, 70-100 g - medium, heavier than 100 g - large. Tomato fruits are flat, flat round, round, oval, noxious, elongated cylindrical and so on in shape.

## Keywords:

Climatic conditions, plants, stems, flowers, seeds, vegetative reproduction, seed weight, root system, temperature, soil conditions.

## Introduction

Tomatoes belong to the tomato family, which is native to the tropics of South and Central America. In tropical climates, tomatoes are a perennial, evergreen plant. By forming a new stem at the base of each leaf, they easily take root and turn into a multi-stemmed tuber. Lying on the ground unable to bear fruit, the stems begin to take root as soon as they touch the moist soil and produce new stems [1-3].

## Materials and methods

Tomato seeds germinate 4-5 days after sowing under favourable conditions. In them, first, the roots appear and grow into the soil, then the seed pods emerge on the soil surface. It has been found that seed germination can be maintained for up to 4-5 years [3-7].

Tomatoes are native to the tropical regions of South and Central America, belonging to the tomato family. In tropical climates, tomatoes

are a perennial, evergreen plant. By forming a new stem at the base of each leaf, they easily take root and turn into a multi-stemmed tuber. Unable to bear its fruit, it lays on the ground, and when its stems touch the moist soil, it takes root and produces new stalks. They replace the ageing, gradually drying out parts of the plant. Along with vegetative reproduction, tomatoes are propagated mainly through seeds - sexually. However, in the northern regions, tomatoes are an annual plant. Because, in temperate climates, tomatoes are an annual crop, and the growth period of the plant ends with the first frost in autumn.

V.I. According to Zuev et al. [4], the tomato is a perennial plant by nature, but it is annual when grown as a crop.

It can grow for more than a year if kept out of the cold. Its fruits ripen 80-160 days after ripening, depending on the variety, method of

cultivation and growing conditions. Tomato seeds are triangular-kidney-shaped, flat, hairy, grey-yellow. The weight of 1000 seeds is 2.5-4 g. Seed germination is maintained for 4-6 years. The tomato root system depends on the method of cultivation and navigation. When grown from seed in the open field, it is star-shaped, grows to a depth of 1.2-1.4 m in the soil and has a spreading diameter of 1.5-2 m. When grown through seedlings, the buds take root and penetrate to a layer of 0.3-0.5 m of soil. In a sheltered place, the root system is placed on a substrate with a thickness not exceeding 30 cm. In addition to the main and side roots of tomatoes, if part of the stem is buried in moist soil, it has the property of additional (adventive) rooting from the soil. This allows

the plant to multiply rapidly by rooting any part of the stem and the branch of the bush when necessary [8-13]. According to the data, an adult tomato plant forms a bush consisting of one or more stems.

The leaves are spirally arranged at the base and are ring-shaped-odd-shaped. The leaves are erect (vertical) relative to the stem, horizontal and bent to the ground. Tomato leaf consists of slices, slices and slices. Depending on the number and degree of shear, the slices may be flat, with fewer and more sliced, large sliced potatoes resembling large sliced potatoes. The leaves of the stem (vertical-growing) varieties are simple and similar to those of potatoes, the stem is located, the leaf band is short and the leaf surface is very curved (Fig. 1).



**Figure 1. Types of tomato leaves**

Leaf shape, size and colour vary greatly with age, variety and growing conditions. The leaf differs in the shortness of its life span (3-4 months) relative to the stem and root [14-17]. Tomato stalks are round, juicy, covered with feathers, blue. The stem becomes woody over time.

### Results and discussion

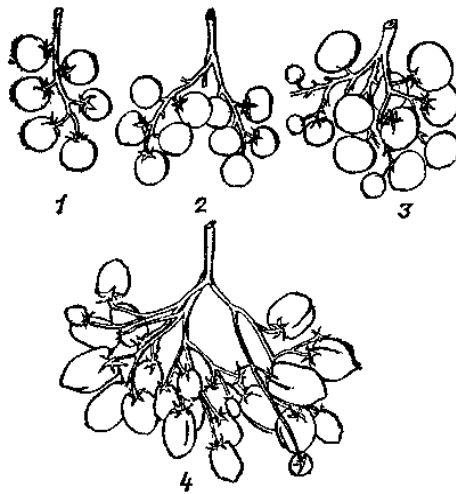
Tomato plants grow slowly at the beginning of the growing season, they produce only 3-4 leaves in a month. Later the plant grows faster and after 6-12 leaves the main stem is completed with a ball flower. The body, growing from its tip, grows monopodially until it forms the main stem, forms the first inflorescence, and emerges as the bud branches. In a monopodial branch, 4-6 to 12-15 leaves are formed, from which axillary (bachki) branches grow. Once formed in the first inflorescence, the plant continues to grow due

to the development of buds in the upper leaf axils below the inflorescence. As a result, due to sympodial branching, a secondary stem is formed, which completes the growth by forming 3-4 leaves and a flower. From the leaf axils below this inflorescence, a tertiary secondary stem is formed, so that the plant continues to grow chronically.

The next order of stem sympodial budding consists of branches. A flower stalk is a stalk, often referred to as a stalk. Flower shoots - simple unbranched, simple two-branched, intermediate (single-branched), compound (many-branched) and divided into very compound (Fig. 2). The structure and development of the inflorescence are influenced by light levels, temperature, mineral nutrients and other factors. Under normal conditions, it takes 50-60 days from the formation of seedlings to the flowering of the first flower. Flowering goes from bottom to top.

If the side branches of indeterminant varieties are removed, 3–4 inflorescences bloom at the same time. Determinant varieties bloom at the same time because the inflorescences are denser. The duration of flowering of a normal flower shoot is 10-20 days, and that of a

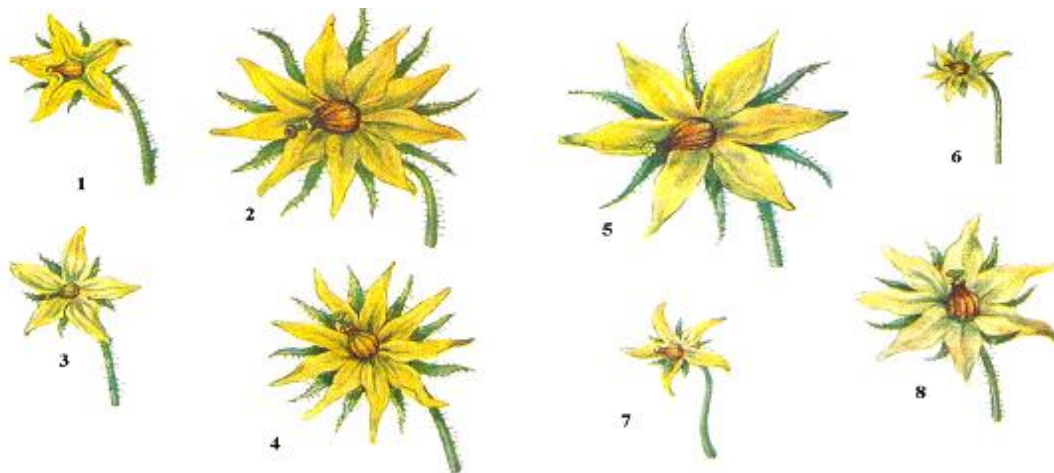
complex one is 30 or more days. Many flowers fall on the inflorescences. Therefore, complex flower bush varieties have lower yields than simple (simple) or intermediate flower bush varieties.



**Figure 2. Types of tomato bouquets:**

1 - simple; 2 - interval; 3 - complex; 4 - multi-branched (very complex)

Tomato flower is bisexual, five or six-lobed. In large-fruited varieties, flowering, joint growth is common (Fig. 3).



**Figure 3. Tomato flowers:**

low-segmented - five-segmented (1, 3, 7); multi-piece - more than five pieces (2, 4, 5, 6, 8); yellow (1, 2, 4, 5, 6, 7), orange (3, 8), small (1, 3, 6, 7); large flowers (2, 4, 5, 8); hairy (1, 2, 3, 4, 5, 8) and hairless (6, 7).

Tomato flowers bloom for 2–3 days. Experiments have shown that the optimum temperature for pollination of flowers is 24-32 °C, relative humidity - 70-80%. Tomato is a self-pollinating plant. Some varieties produce fruit without seeds. It takes 35-60 days from flowering to ripening.

Tomato fruit - a multi-celled, multi-seeded, fleshy berry. Fruits vary in weight: from 20-50 g to 500-800 g. Weight up to 70 g is small, 70–100 g - medium, heavy over 100 g - large. According to the data, the fruits of tomatoes are flat, flat round, round, oval, noxious, elongated cylindrical and different in shape [18,19,20,21].

The size and shape of the fruit vary not only according to the navigation but also depending on the growing conditions. They are larger and harder (dense) in fertile and moist soils than in soils with insufficient fertility and moisture.

The surface of the fruit is smooth or ribbed. The seeds of the fruit are divided into nests, with few (2-3) chambers, medium (4-5) chambers and many (6 and more) chambers. Many cells are often ribbed. If the seed chambers are less than 4-5, they are usually symmetrically arranged. The symmetrical arrangement of the nests is characteristic of large fruits with many cells. The colour of the fruits of most cultivars is red. Its redness ranges from fiery red to dark red. For fresh consumption, the colour of the fruit is pink, yellow, yellowish-white, purple varieties, relatively, rarely planted.

### Conclusion

Each fruit goes through several stages during the ripening period, during which time its colour changes from green to brown, pink and red. Tomato ripening is divided into two stages: biological and technical. Biological maturation begins 40-45 days after pollination. In this case, the seed pods have their unique size and growth characteristics. In this case, the fruit reaches its maximum size, but it is green. The fact that the colour of the fruit changes from green to red indicates that it is ready to be eaten fresh or processed - it is being processed. Experiments have shown that technical maturation begins 5-15 days after biological maturation. It is based on the practice of picking green fruits for long-distance transport and ripening.

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