American Journal of Biology and Natural Sciences
https://biojournals.us/index.php/AJBNS
ISSN: 2997-7185

Biology of the Gramineae Family and Development Periods of Cereal Crops

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Received: 2024, 15, Nov
Accepted: 2024, 21, Nov
Published: 2024, 14, Dec

Annotation: Growth and development are the processes that determine the productivity of grain crops. Growth is the increase of dry matter, development is the process of formation of plant organs, which fulfills its main biological function in preserving its species. Cereals include wheat, rice, maize, oats, barley, rye, millet, white sorghum, and sugarcane, among the important cultivated cereal crops.

Keywords: Cereals - Gramineae, Wheat - Poaceae, growth, development, grassing, tufting, tuberization, earing, fruiting, flowering, ripening.

Grasses (Gramineae or Poaceae) are a family of monocotyledonous plants. They are annual, biennial or perennial grasses, sometimes shrubs or trees. The stem is cylindrical, erect or ascending, divided into joints, and hollow inside, therefore it is also called straw or straw. 600 genera and 10,000 species of grasses are known, 91 genera (270 species) grow in Uzbekistan, they are widespread in all parts of the world, most species form thick grasslands, hayfields, meadows, savannas in tropical countries. Grasses include important cultivated grain plants - wheat, rice, maize, oats, barley, rye, millet, white sorghum and sugarcane. Wild-growing species - einkorn, ryegrass, wheatgrass and many others - are considered fodder for farm animals (see forage crops). Some types of cereals are used as technical plants, from which starch, alcohol, paper, aromatic and edible oils are obtained, and they are used in the manufacture of building materials, ropes, ropes, etc. Most species are medicinal, some are ornamental, and some are weeds.

Growth and development are the processes that determine the productivity of grain crops. Growth is the increase in dry matter, development is the process of formation of plant organs, which performs its main biological function in preserving its species. The alternation of developmental periods in plants is expressed in the appearance of new organs.

Germination requires a certain amount of water, heat, and oxygen for seeds to germinate. The swelling of the seed in water depends on the activity of enzymes. The germ and endosperm of the grain absorb water to different degrees, which causes the grain shell to crack. Enzymes convert complex substances (fat, protein, starch) into simple substances that are soluble in water. The amount of water required for the swelling and germination of grain seeds varies: wheat - 47-48, rye - 58-65, barley - 48-57, oats - 60-76, corn - 37-44, millet and sorghum - 25-38% (by weight of grain). The rate of water absorption is affected by temperature. Grains can germinate even at very low temperatures, this temperature is 1-3° for wheat and barley, 8-10° for corn and millet, and 10-12° for rye and rice. The germination rate also depends on the seed; if the grain is floury, it absorbs water well and sprouts quickly. During seed germination, primary roots first begin to grow, then the stem begins to grow. Germination is noted when the first cotyledon appears. If conditions are favorable, the cotyledons sprout 5-7 days after sowing. The germination period lasts 10-12 days. At the end of the period, the plant has developed 2-4 cotyledons and the taproot is up to 30-35 cm long. The color of grasses varies depending on the plant species: wheat is green, rye is purple, oats are light green, barley is bluish-gray, and millet-like crops are green. The appearance of new additional stems indicates the beginning of the tillering period. Additional stems are formed from the highest underground joint, usually 1-3 cm below the ground surface. This joint is called the tillering joint. The tillering joint is the most important part of the plant, it stores nutrients, and the strength of the root system, its resistance to cold and drought, depends on the location of this joint. If the tillering joint is damaged under adverse conditions, the plant dies. Side branches and secondary roots develop at the tillering joint. Secondary roots are located in the upper part of the soil. The taproots grow well during this period and reach 40-50 cm. The number of stems developed in a single plant varies, depending on the biological characteristics of the plant, temperature, and water and nutrient supply. The average number of stems developed in a single plant is called total tillering. The average number of stems that produce ears in a single plant is called productive tillering. This varies depending on the type of plant: 3-6 in winter cereals, 2-3 in barley and oats, and 1-2 in spring wheat. If the tillering period is prolonged, the total tillering decreases and productive tillering decreases. The tillering period can pass at 5°, but the optimal temperature for this period is 10-15°. If the temperature exceeds this, the plant will tiller quickly, but productive tillering decreases. In general, the tillering period lasts 20-25 days. The tillering period in cereal plants occurs at different times, that is, in rye and oats, additional stems appear when 3-4 leaves appear, in barley and wheat when 3 leaves appear, in millet when 5-6 leaves appear, in corn when 6-7 leaves appear, and in oats when 7-8 leaves appear. The different water requirements of cereal crops also depend on this phenomenon. The total number of productive stems is 350-400 per square meter, which provides a yield of 20-30 tons of grain per hectare. Under the most favorable conditions, the number of productive stems can be up to 700-800 per square meter.

Tillering is the elongation of internodes or the growth of the stem and the formation of generative organs. During this period, the plant begins with the elongation of the internode that has developed above the node. The growth of the first internode takes 5-7 days. On average, after 10-15 days, it stops growing, after which the second internode begins to grow. The growth of the plant stops when flowering begins. This period also lasts 20-25 days. The daily growth is 3-5 cm in low-growing cereals, and 8-12 cm in corn and oats.

Heading or earing begins during the tillering period. The beginning of the period is marked by the appearance of half of the flower cluster from the upper leaf sheath. The correct formation and development of the ear depends on the nutrition during the period of gathering and winding the straw, the ratio of nitrogen and phosphorus must be correct. This period lasts 10-15 days.

Flowering - usually flowering begins after ear formation, with an average difference of 2-3 days, barley blooms before the crop, ear formation after the leaf sheath, and rye blooms 8-10 days after ear formation. Cereal crops are divided into two groups depending on the characteristics of pollination. 1) self-pollinating plants are wheat, barley, oats, rice, tarik.; 2) cross-pollinating plants are rye, corn and sorghum. From the flowering period, cereal crops become demanding on light, temperature, and moisture. This period lasts 10-15 days.

N.N. Kuleshov divides the ripening of grain crops into three periods: grain formation, grain setting and ripening. Grain formation begins after pollination of the flower. It takes 10-15 days for the formation of grain shells. During this period, the weight of 1000 grains is 8-12 g. Starch accumulation in the grain lasts 20-25 days, and the grain moisture content is 37-40%. In practice, grain ripening is divided into three periods. 1) Milk ripening period - lasts 10-15 days, the plant is green, only the lower leaves turn yellow. The grain is filled with a milky liquid, its moisture content is 50-51%, the crop is not harvested during this period. 2) Tumor ripening period - the plant turns yellow, its moisture content is 22-30%, and this period lasts 10-12 days. Varieties that shed their grains when the grain is fully ripe are harvested at the time of full ripening. They are first harvested and then harvested and threshed when the grain is fully ripe. During this period, the grain is separated from the mother plant. 3) Full ripening period - the plant turns completely yellow and shrinks somewhat, the grain is not hard, and its moisture content is 14-19%. During this period, the crop should be harvested quickly. This period lasts 8-10 days. When the grain has the ability to germinate, it is considered fully ripe. All agrotechnical measures should be carried out strictly according to the stages of plant development, taking into account the role of individual stages in the formation of yield and the conditions required for its passage.

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