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USING SCANNING ELECTRONIC MICROSCOPY IN ANATOMICAL STUDIES OF FLAX

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Abstract: The results of an anotomic study of the stems of flax varieties of long-flax of different ecological and geographical origin in solving the problem of resistance to adverse conditions leading to crop destruction are shown.
Keywords: flax varieties, crop and fiber quality, mechanical fabrics, elementary fibers.

Flax has long been a traditional spinning culture of the Polissya and western regions of Ukraine. It has great potential for multi-purpose industrial use - the production of fiber for the textile industry, high-quality oil for food, technical and medical purposes, as well as biologically valuable food and feed concentrates. This culture is also important in strengthening the agricultural economy of the poor Polissia soils [1, p. 64].

Flax is capable of producing high-quality fibers from which fabrics of various purposes are made – from thin wool and napkins to tarpaulins and burlap. Flax fiber is the most valuable of all known types of bast fibers. It has good spinning properties

due to its flexibility, durability and ability to divide well into individual fibers. In breaking load, it exceeds significantly cotton, wool and jute [1, p. 64-65; 2, p. 55].

Flax is a culture of mild climate; its cultivation area is mainly related to the mixed forest area. The climatic conditions of this zone are characterized by warm summer and sufficient humidity, and are therefore favorable for the cultivation of flax. At the same time, during the summer months, there are periods when hot days are replaced by downpours with hail and squalls, which lead to the complete deposition of crops of flax. For flax culture, it is important to lay down, which reduces the yield and quality of flax. The danger of flax lying in the early stages of ontogeny lies in the curvature of the stems, which causes worse leaf illumination, reducing the photosynthetic potential of plants. The lack of assimilates during this period provokes the formation of thin-walled elementary fibers, the laying of fewer boxes on the plant, the imperfection of seeds. The formation of flax during the formation and pouring of seeds complicates the technological process of harvesting, reducing the quality of fibers and seeds [3, p. 5].

There is a problem of creating and growing varieties of flax, which can withstand adverse conditions that lead to the destruction of the crop.

As material for studies were varieties of flax, that havedifferent ecological and geographic origin.

Gladiator (Ukraine). Mediummatured variety (vegetation period– 68–77 days), tall, high-fiber, belongstothe medium-resistant to the main pathogens–Fusarium and anthracnose. Lying resistance is average. The fiber content of the stemsis 28,3%; strawyield– 7 – 8 tons per hectare; fiber – 1,9 – 2,3 tons per hectare; seeds–0,7 – 0,9 tonsperhectare.

Zhuravka (Ukraine). Early matured variety. Seed yield– 0,4tons per hectare,straw yield– 4,5 tons per hectare; fiberyield–1,1 tons per hectare. The fiber contentis 24,0%.

Field experiments took place at the experimental field of the Institute of bast crops of the NAAS (Hlukhiv, Sumy region, Ukraine). For anatomic studies of flax stalks used scanning electronic microscope «Selmi-107», according to the next steps:

1) cutting dry plants (area of hypocotyl);
2) fixation fragments on carbonic lamellas;
3) vacuum dusting with graphite;
4) samples scanning.

The thickness of the cell walls was measured by Digimizer Image Analysis 4.3.0.0.For that section of cuts both with a compact placing of cells and with a non-compact was chosen.

According to the electronic images, there are anatomic differences between flax varieties. Mechanical tissues inplants of the Gladiator variety are marked from the outside with a certain density and compactness; a feature of the stems of plants of this variety is the absence of sieve tubesunder the epiderm is that form the fiber (Fig.1,a). The Zhuravka's variety anatomical structure of the stems is marked by poor layout of cells of mechanicalt issues. Irregularly shaped cells with corrugated walls, the heights of the compacted cell sare very weak. Ingeneral, the tissues are loose, not uniformly compacted. Elementary fibers were not found on the periphery of the cut (Fig.1, b).

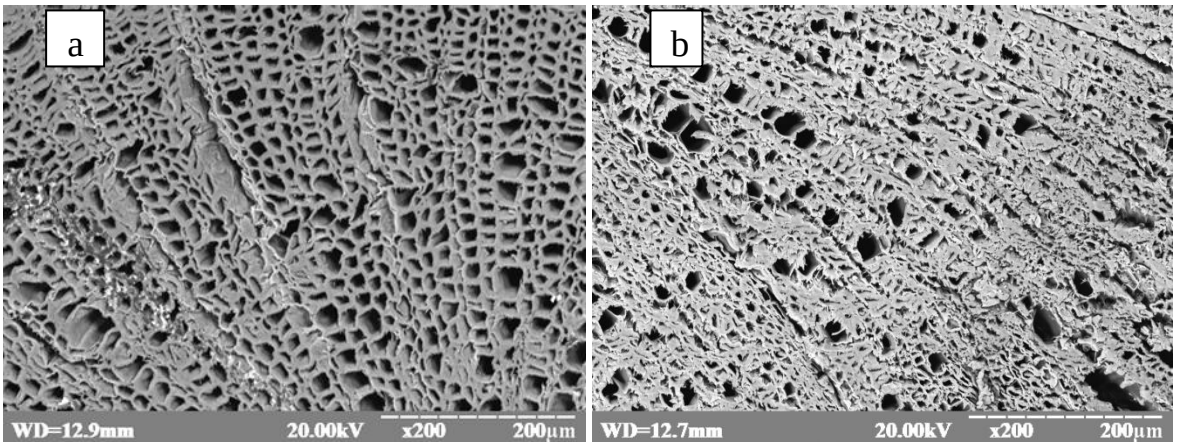

Fig.1. Samples of hypocotyl cut of Gladiator flax (a) and Zhuravka (b).

Measurements showed that the thickness of the cell walls of the tissues of stems of the Gladiator variety, on average, is thicker than of the Zhuravka variety. It's also was found that varieties have different maximum and minimum thickness (table 1).

Table 1

The thickness of the cell walls of the tissues of flax plants hypocotyl

Variety	Measuring	The cell wall thickness, μм			Cell deformation
		Mean	Max	Min	
Gladiator	250	1,30	2,96	0,40	Cell not deformed
Zhuravka	250	0,60	1,00	0,35	Cell hard deformed

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