

INVESTIGATION OF THE INFLUENCE OF WINTER WHEAT'S LOCATION ON PLANT'S GERMINATION ENERGY

V.M. Zubko, candidate of technical sciences, associate professor,

T.V. Kuzina, postgraduate student.

Sumy National Agrarian University,

160 Herasyima Kondratieva Str., Sumy city, Ukraine.

This article deals with the increase of winter wheat yield by providing optimal conditions for intensive germination of seed material and rapid energy accumulation by the plant under conditions of adequate moisture and temperature conditions.

Key words: *optimal, rapid, energy, grounding, intensity, development, yield, seedlings, winter wheat, "galloping".*

Challenge problem in general terms.

In recent times we observe decrease of ground productive moisture in the soil in the period after winter. It's connected with decreasing amount of snow in winter period and low amount of precipitations in spring period. It's necessary to take into account (point out) unstable meteorological conditions, which sometimes prevent from good and duly sowing. Therefore the time for sowing is very limited. For this reason the question of creating and implementing measures for intensive germination and further plant's development is of high priority. Only providing necessary conditions for seed material we will obtain quick and harmonious seedlings.

The problem is that failure to comply with the main task of sowing – provision of

optimal plants amount on 1 sq. m and their effective location in the seed's bed (the location, which allows to obtain get quick seedlings), can lead to the yield lost, seedlings increase and labor and means expenditure.

Analysis of the latest investigations and publications.

Agrarian and industrial potential of Ukraine is very large. Agrarian field has to provide provisions, fodder, raw materials for industrial processing not only domestic needs of Ukraine, but can become a reasonable, perhaps in the perspective, exporter of its products [1].

Due to the modern farming system almost all plough lands are covered by seeds, moreover cultivated area often exceeds the plough area, seeds of arable and catch crops are widely used. These systems are characterized by active action on the soil in order to increase its fertility with help of means, which the industry produces [2].

In all Ukrainian zones at the minimal rate of seeds sowing (2-3 mln/ha), in comparison with optimal, only the upward trend of the protein and fibrin load in the seed and yield decreasing is observed.

Seed's quality under the influence of sowing terms differs. While sowing at very early or late terms the protein and fibrin load increases. Nevertheless, despite the fact that under these terms protein and fibrin load increasing occurs in the seed, such terms lose their production practical use as the yield immensely decreasing, sometimes more than in twice, in comparison with the yield of optimal terms [3], [1].

While growing winter wheat one of the main tasks is saving its high yield. In scientific works of V.V. Lykhochvor [5], I.M. Svydyniuk, O.V. Shmorhun [6]. V.M. Zubko [4] and others the issues of sowing technologies improvement and optimal winter wheat development and growth conditions provision were deeply investigated, methods and measures for creating the best conditions for plant's growth and, as a result, getting of high yield, were developed.

Optimal plants growth's conditions are created at correct definition of sowing terms, sowing norms, area of plant nutrition and sowing technology and the most important – seed location.

Grounding is the final sowing stage, in which take place changes of seed's properties and create conditions for its germination. Sowing machines have to provide implementation of these conditions. [7].

Formulation of the object of the article.

The object of this article is to investigate plants' development in order to substantiate optimal seed location in the seed's bed for

accelerating intensity of germination, root system and above-ground plant's part.

Presentation of core material.

For the present, wheat takes the leading place in our country. With intensive growth technologies increase, much more attention is paid to yield increasing and improving of seed's quality. While sowing many factors occur, which, in their turn, substantially affect it: uneven field surface, seed spacing, quality of seed's bed preparation, depth of grounding, influence of seeding machines on physical and chemical content and properties of soil etc.

One of the main factors for getting high and qualitative yield of winter wheat is optimal depth and evenness provision. But, unfortunately, not every seeding machine can provide perfect location of the seed in the soil, as while sowing it's necessary to take into account one more very important factor – “galloping” (deviation, bouncing, flying away) while seeds sowing in the row at their first contact with the soil. It occurs when a seed falls down from the opener to the soil, because there is a distance between them. The seed can fall down either exactly in the row, or across, or stand vertical or “fly away” at all. Even if one digs up the seed row in the field – it's clearly seen that wheat is located in a random way; there is no straight position or line, which can be observed. At that, unevenness along the depth of seeding of the seeding material is observed.

Investigations were made to clarify how the seed must be located in the soil and in what way we can achieve it. For providing these

conditions we shall use such seeding machines, which would allow us to achieve the straight seed's location in the soil and prevent "galloping".

Because of unevenness of sowing field germinating ability of seeds is decreasing and, consequently, yield is decreasing too. It's explained, first of all, by the fact that those plants, which are optimally located in the soil need less time for germination, and those plants, which lie in a random way, or deviated from the row center (in other words, where the galloping takes place), occurs competition among them on early stages of their development. And this, in its turn, will lead to the situation, when better developed plants will have bigger heads, and less developed plants

– smaller heads, that is why of this we will obtain worse yield.

We have conducted a range of investigations directed to define intensity of germination and further development of root system and above ground part of wheat depending on seed's location in the soil. According to the results of investigations it has been defined that a seed should be located vertically in the row to have a seedling be on the top, which in its turn accelerates germination of the seedling and enlarge intensity of its development. If a seed lies vertically, or across in the seed's bed – a seedling needs more time for germination, as it's located far from the ground and it must make its pathway before it stand vertically and germinate (Fig.1).



Fig. 1. Germinations of winter wheat's seedling

Incorrect location of a seed extends not only the terms of seedlings appearance, but also seedlings can be very thick, the part of them, not having reached the surface, can die, plants' development in the first period is getting slower. Especially it's necessary to admit the fact that appearance of the seedlings is 2 days late.

According to the results of conducted investigations, it's clearly seen that under equal conditions of winter wheat sowing,

plants' seedlings are different. At vertical location of a seed under the optimal weather conditions – a seedling appears in 35 hours. At random location – in 49 hours. On the average, the difference between the heights of sprout is appr. 2.09 cm (Fig. 2).

Conducted investigations allowed to discover one more important factor, which influence further plants' development – it's a well-developed seedling's root system.

Wheat doesn't form the taproot. For the very beginning of germination seed has several almost equally developed rudimental roots. In the process of further growth and development additional or nodal roots begin to form from the lower stems, which create a fibrous root system.

Seed germinates a few roots: at first one root appears, in 3-4 days the second and the third roots appears above the first, then – the fourth and the fifth, which are located in the area in parallel to the scutellum of the seed beetles.

At vertical seed's location – root system is best developed, which will provide good hibernation.



Fig.2. Intensity of winter wheat's growth and development in accordance with the way of seed's location.

From the Fig.2 it's seen that vertical sowing of winter wheat (with seedling upward) has benefits in germination and development. At such wheat's sowing even sprouts appears. As long as in autumn, because of unstable meteorological conditions every hour can play an important role for their

germination. Germinated stems develop quicker, they are more resistant to decrease of temperature and also over-winter better.

According to the conducted results it has been proved that if you know exactly how to locate wheat's seeds in the seed's bed, then under condition of providing good sowing, it's

possible to achieve all conditions for getting maximum yield.

Conclusion.

On the basis of conducted investigations we can say, that the grain industry is the rationale of agricultural production. It provides completely the population of our country with food products and enriches state's income by means of export. That's why improvement of cereal crop' yield is the most important task.

According to the analysis of the last investigations it's clearly seen that while germination of winter wheat, the whole yield potential isn't fully used. At uneven division of plants' number per unit of area – different conditions of development appear. Investigation of optimal location and technology of seed grounding give the opportunity to get higher yield, spending less seed material and money.

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