

## **INFLUENCE OF HARVEST FEATURES ON SEED PRODUCTIVITY OF MILLET IN THE RIGHT-BANK FOREST-STEPPE OF UKRAIN**

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*It was found that the maximum seed productivity provides separate threshing of millet sowings with the presence of 65-70% of mature seeds in the panicle with the term of store maturation of the swath from three to six days, and direct thrashing with 85-90% degree of maturity.*

**Keywords:** *millet, seeds, maturity degree, harvest term, harvest method.*

**The aim of research** was a comprehensive study of the mutual influence of mowing terms, duration of swath maturation and weather conditions during this period on the level of millet seed productivity in conditions of the Right-bank forest-steppe in Ukraine.

**Research materials and methods.** Studies were conducted during 2011-2013, in the field crop rotation of Plant Growing Department. Two-factor field experiment on the impact of harvesting peculiarities of seed sowing included such factor gradations: *A (degree of seed maturity in panicle) – 25-30%, 45-50, 65-70 (control) and 85-90% seed reached the phase of full maturity; B (duration of swath maturation) – straight-combine method and in three, six (control) and nine days after mowing.* For sowing mid-season variety of seed millet Zolotyste was used.

Field and laboratory studies, records, analyses and monitoring were carried out in accordance with conventional methods.

Comprehensive assessment of moisture and temperature conditions during years of research by hydrothermal coefficient (HTC) of G.T. Selianynov shows that millet growing season in 2012 was characterized as medium dry (HTC=0.6), and in 2011, 2013 and 2014 – respectively overly (HTC=2.0) and sufficient (HTC=1.0-1.5) wet. In

this case, as a rule, for the time of full maturity there is hot weather, and only in some years (2011) a significant amount of rain during this period caused partial drooping interfered with harvesting.

**Research results.** Weather conditions of the cultivation year made significant adjustments to the formation of seed yield level. Yes, hot and dry conditions in 2012 resulted in liquefaction of seed coenosis and significant acceleration of generative processes in maternal plants of millet. Thus, under conditions of 2011 liquefaction of plant density was partially compensated due to increased coefficient of productive tillering with significant moisture, then dry conditions in 2012 led to forming only one stem plants. The most successful year in this regard was 2013; the optimal distribution of rainfall and temperature conditions at the level of biological optimum during the growing season of millet seed sowing provided the best survival and density of productive haulm stand. Accordingly, the yield of millet seed sowing in conditions of 2013 on average for research variants was 3.62 t/ha compared with 2.72 and 2.53 t/ha in 2011 and 2012.

According to the results of a comprehensive assessment of studied agricultural methods, as well as weather conditions during harvest formation empirical mathematical model was constructed:  $z = 2.84 + 0.049 \cdot x - 0.03 \cdot y$ , that describes close direct multiple correlation ( $r_{z/xy} = 0.62 \pm 0.04$ ) between maternal plant yield ( $z$ ), rainfall ( $x$ ) and the amount of effective temperatures ( $y$ ) during the period of ripening millet seed.

Biological analysis of the content of this connection has shown that with the extension of duration of this period, the accumulation of amount of effective temperatures and rainfall has a positive effect on increasing millet seed yield. In addition, according to the analysis of pair interactions it is found that seed yield is approximated by 37% with the amount of effective temperatures and by 29% – with rainfall during ripening.

However, as shown by results in 2013, further delay with recommended timing of harvest (65-70% of mature seeds in panicle) were combined with a significant amount of rain in the third week of August, resulting in significant crop losses due to

abscission of the heaviest and mature seeds. Thus, between yield of maternal plants and rainfall in the period of 85-90% of seed maturity in panicles an inverse close correlation was found ( $r = -0.82 \pm 0.00$ ) which indicates a significant predictability (68%) of seed losses because of the difficulty of threshing and abscission.

### **Conclusions.**

1. Getting the highest yield of millet seeds by separate way of harvesting promoted the use of mowing term when its degree of maturity in the panicle reached 65-70% – according to average variants of thrashing 3.85 t/ha. Premature cutting (25-30 and 45-50%) and its delay (85-90%) were accompanied by significant losses of seed yield – 0.44, 0.24 and 0.56 t/ha respectively.

2. During dead-ripe stage to roots (degree of maturity 85-90%) the most appropriate is direct threshing of maternal plants – yield was 3.55-4.21 t/ha during years of research that only under conditions of 2013 was significantly lower (0.36 t/ha) than in control variant of harvesting (65-70% of mature seeds in panicles with swath maturation for six days). Premature direct threshing resulted in significant losses of seed yield (0.69-2.28 t/ha), they were the largest during its full maturity (only 25-30% of seeds in the panicle) – yield during all years of research was only 1.16 -1.82 t/ha.

3. Swath maturation had an ambiguous effect on harvest: by 25-30 and 45-50% of mature seeds in the panicle it was the most effective for a minimum of six days; by 65-70% – variants of three and six days were equally effective; by 85-90% – this agricultural method was inappropriate.

4. The most significant factor that ensured maximum harvest of seed material was a good combination of choice of mowing term and duration of swath maturation – 39-44% impact share. Separate use of such agricultural method, as swath maturation turned out to be equally influential – 33-41% respectively.

5. Between yield of maternal plants, rainfall and the amount of effective temperatures there is a close direct multiple correlation which indicates that extension of duration of this period, accumulation of amount of effective temperatures and

rainfall have a positive effect on increasing millet seed yield. However, in terms of researched region on delay of harvest terms prognosis of significant seed losses increases as a result of its abscission because of the threat of a significant rainfall and thrashing difficulty.

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