WORK QUALITY INDICATORS CORN HARVESTING MACHINE IN HARVESTING OF CORN WITH A DIFFERENT STAGE OF VEGETATION

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Abstract: *the experimental results with regard to studying the variety of running performances of a corn machine that harvests the corn having the different vegetation period (earlier matured, midseason matured, late-season matured) are specified in the article. After comparing the results of conducted experiments the developed harvesting machine's running performance indicators depend on the type of the corn being collected whether it is: earlier maturing, midseason or late-season maturing as well as its physical and mechanical properties. In the event when the corn is harvested for grains in a form of crusted cobs (that means to separate grains) it would be better if it is collected in the period of wax maturing and it contains less foreign admixtures as well as it outcomes to get better of running performance indicators of the harvesting machine.*
Keywords: *corn harvesting machine, corn types, early maturing, midseason maturing, late-season maturing, stalk, corncob, corn, yield, running quality indicators.*

КАЧЕСТВЕННЫЕ ПОКАЗАТЕЛИ РАБОТЫ КУКУРУЗОУБОРОЧНОЙ МАШИНЫ ПРИ УБОРКЕ КУКУРУЗЫ С РАЗНОЙ СТАДИЕЙ ВЕГЕТАЦИИ

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Аннотация: *в статье приведены результаты экспериментальных исследований работы кукурузоуборочной машины при уборке кукурузы с разной стадией вегетации (скороспелый, среднеспелый, позднеспелый). После сопоставления результатов проведенных экспериментов показатели эксплуатационных характеристик разработанной уборочной машины зависят от типа собираемой кукурузы, будь то: более раннее созревание, середина сезона или созревание в конце сезона, а также его физико-механические свойства. Уборка кукурузы на зерно без очистки початков была бы лучше, если бы они собирались в период созревания воска и содержали меньше примесей, а также чтобы получить лучшие результаты, нужно использовать показатели производительности уборочной машины.*
Ключевые слова: *кукурузоуборочной машины, сорта кукурузы, скороспелый, среднеспелый, позднеспелый, стебель, початка, зерно, урожайность, качественые показатели работы.*

In effort to satisfy the needs of our people for agricultural products at the result after organizing livestock and poultry farms the demand for feedstuff and coarse, as well as demand for corn grains and silage is increased. Therefore, the corn as the major and second crops are grown in Uzbekistan at a large scale. Harvesting of the grown corn crops by consuming less energy and expenditures without reducing the quality are considered as one of important tasks.

In the world practice in harvesting of corn methods of collecting it in a form of grain or corncob are applied [1, 35-36].

In the event if corn is collected by the combined harvester-thresher in a form of grains, corncobs are separated from stalks, threshed and separated at combine thresher. Due to that in Uzbekistan the corn stalks are used as coarse forage for livestock as well as vegetation period is long lasting (120 days) and the corn grown as a second culture after wheat will not get dried sufficiently such method is applied in very few fields.

The corn is harvested in a form of corncob in two ways that means the corncobs are collected by cleaning them from the crust or not cleaning. This method is implemented by harvesting machine or combined-harvesting machines. In this case corn stalks are reaped, corncobs separated and threshed, then it is leaded into the truck

going just behind the machine. The cobs (corncob) are cleaned from the crusts or not cleaned, then loaded onto the truck wagon trailed to the harvesting machine.

In this reaping method due to that the corn's grains as well as its stalks are harvested, even when corncob humidity is 30-40% there is a possibility to harvest it, is more prestigious in Uzbekistan.

Considering all above, resources-saving harvesting machine for collecting the corn in a form of crusted cob has been developed [2, 230-232].

In effort to determine the running qualitative performance indicators of the worked-out machine it was tested and searched on the earlier maturing, midseason maturing and late-season maturing grades of the corn. In the following table the agro background characteristics of fields where the experiments were implemented are given:

Table 1. Corn crop indicators on the experimental field

№	Name of indicators	Values of crop indicators		
1	Corn type	Earlier matured	Midseason matured	Late-season matured
2	Number of bushes, pieces/running meter - average M_{hrv}	6,8	9,4	6,7
3	Height of stalks, cm - average M_{hrv}	168,2	180,6	252,1
4	Stalks diameter, mm - average M_{hrv}	12,5	15,5	20,8
5	Corncobs diameter, mm - average M_{hrv}	35,5	39,5	39,8
6	Crops productivity, t/ha - on corncob - on stalk	 3,0 3,6	 3,5 4,4	 5,0 10,1
7	Humidity, % - stalk - corncob - grain	 17,2 22,6 16,3	 17,4 23,8 16,4	 26,8 31,3 26,2

Looking at the (table 1) it can be noticed from the provided data that on the fields, where experiments has been conducted depending on the corn types its size and weight indicators differ each from one another. In this case humidity of earlier and midseason maturing corn is less than the late-season maturing corn for almost 1,5 times.

Firstly the harvesting machine was applied by using the earlier grade corn. In this case the running performance speed of tractor has been set on 1000 rpm. After that when the harvested as analysis con ducted on the performance indicators it was determined that the reaping height averagely amounted in 30,6 cm; cob collecting completeness – 96,8%; leaves-stalk quantity on cob – 3,6%; running (operation) capacity– 1,5-1,8 tons per hour (table 2).

Table 2. Performance indicators of the Corn crops harvesting machine

№	Name of crop indicators	Corn types		
		Earlier matured	Midseason matured	Late-season matured
Experiment results				
1	Reaping height, cm	30,6	30,8	32,0
2	Harvesting completeness of corncobs, %	96,8	97,4	98,2
3	Quantity of leaves and stalk having on the corncob, %	3,6	3,4	2,1
4	Running capacity, t/hr (on corncob)	1,5-1,8	2,1-2,4	2,5-3,0

At the same running work conditions on the midseason maturing grade of the corn is also harvested by the harvesting machine. In this it was determined the average machine reaping height amounted in 8 см; collecting completeness of cobs– 97,2; leaves and stalk quantity on cob – 3,4 %; running capacity– 2,1-2,4 tons per hour.

In the event when the late-season maturing corn of corn is harvested by harvesting machine, its speed has been changed to 0,8 m\s. Due to machine's running work speed was 1,1 m\s the corn yield productivity was higher the machine's internal operation elements got stucked with stalks frequently it couldn't run. When the harvesting machine was running at a working speed of 0,8 m\s its reaping height – 32,0 см; collecting completeness of corncob 98,2%; leaves-stalk quantity on corncob - 2,1%; crops productivity – 2,5-3,0 tons per hour.

Conducted experiments showed that when the corn productivity was higher the machine's running capacity will also be higher. And such case we can see in the following: if we harvest the earlier maturing corn the yield

productivity amounted in 3,0 tons per hectare and due to this running capacity– 1,5-1,8 tons per hour; in midseason maturing one the crop productivity – 3,5 tons per hectare, due to that run (operation) capacity– 2,1-2,4 tons per hour; in late-season maturing corn, due to crop productivity was 5,0 ton\hectare the running capacity amounted in 2,5-3,0 tons per hour.

When collecting the earlier and midseason maturing corn due to its humidity was lower (17,2-17,4%), the quantity of leaves-stalk containing in the collected corncob amounted in 3,6 and 3,4%, relatively it was higher.

When collecting the late-season maturing corn due to its humidity was higher (26,8%), relatively the quantity of leaves-stalk containing in the collected corncob was relatively lower and it amounted in 2,1%.

Conclusions. After comparing the results of conducted experiments the developed harvesting machine's running performance indicators depend on the type of the corn being collected whether it is: earlier maturing, midseason or late-season maturing as well as its physical and mechanical properties. In the event when the corn is harvested for grains in a form of crusted cobs (that means to separate grains) it would be better if it is collected in the period of wax maturing and it contains less foreign admixtures as well as it outcomes to get better of running performance indicators of the harvesting machine.

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