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RESEARCHES ON DEVELOPMENT GRAIN GRINDER-CRUSHER FOR FARMERS AND PEASANTRY FARMS

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ANNOTATION

In Uzbekistan the cattle is being fed by privet or peasantry farms, farmers and other types of agricultural organizations. There is no any grain grinder for farmers who have a few numbers of the cattle. Therefore, the small grain grinder-crusher was developed for them. It was defined that the grinding efficiency the corncob by the grinder-crusher was 99,2 per cent, crushing efficiency was 98,1 per cent, work efficiency was 130,4 kg/hour, expenditure of energy organized average 2,8 kW. And the grinding efficiency the grain of corn made up 99,6 per cent, crushing efficiency was 98,4 per cent, work efficiency in real work period constituted 172,5 kg/hour, expenditure of energy was average 3,6 kW. As if this situation was defined while grinding the grain of wheat and burley. It can be seen that, the work efficiencies increase considerably when the grain is ground than the corncob is ground, but together with this, the expenditure of energy rises to 28 per cent.

Keywords: grain grinder-crusher, farms, wheat, cattle animals, agriculture,

INTRODUCTION

The cattle-raising is one of the main branches of the agriculture in Uzbekistan. Therefore, it is being paid great attention to develop the cattle-raising by the government of the Republic. According to last year situation along the Republic when species of cattle animals that being fed were compared the sheep and goat were equal to 62,2 per cent of the total cattle animals, and also the big horned cattle made up 37,0 per cent, horses were constituted 0,8 per cent.

When data was analyzed about dividing of available cattle animals on farms, the following situation was known. Total 18447,4 thousands of sheep and 14771,6 thousands of goat or 8,9 per cent was share of farms, 1650,9 thousands or 11,1 per cent of cattle animals depended on other agricultural organizations (figure 1).

As if above situation when dividing of big horned cattle was analyzed too, 10328,1 thousands heads of big horned cattle or nearly 94,0 per cent are fed in peasantry or privet helper farms, 545,2 thousands heads or almost 5,0 belongs to farmers, 109,8 thousands heads or nearly 1,0 per cent of cattle animals might be seen to feed in other types of agricultural organizations (figure 2).

The horses make up smaller index according to head number among cattle animals in our country, namely total there are 213,33 thousands heads of horses, it is equal to 0,8 per cent all of the cattle animals. However, it should not be forgotten that, one horse eats forage production of 2 horned cattle animals and 5-6 sheep and goat.

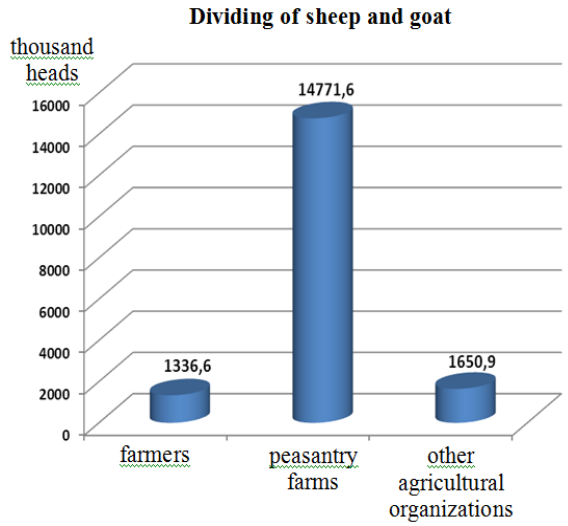

Figure 1. Dividing sheep and goat on farms

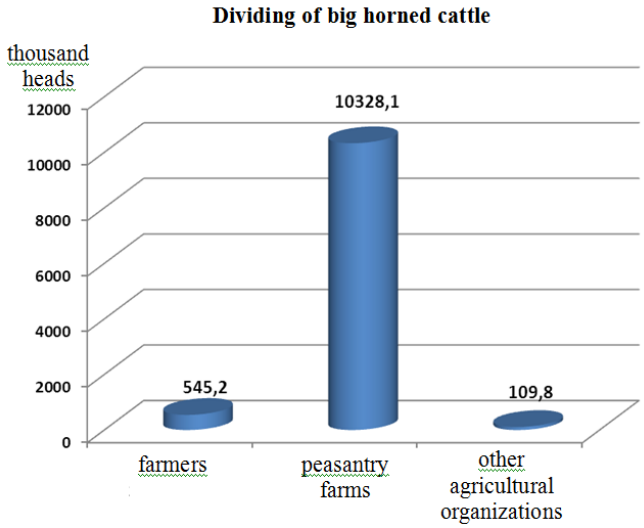

Figure 2. Dividing of big horned cattle on farms

When we see dividing of horses on types of farms, we can see as if above written situation, namely the most 85,0 per cent (180,39 thousands heads) horses are being fed in privet or peasantry farms, 9,7 per cent (20,648 thousands heads) horses in farmers and 5,8 per cent (12,29 thousands heads) horses are being fed in other types of agricultural organizations.

It is seen that from above written information, in Uzbekistan 80-90 per cent of cattle animals are being fed in privet helper or peasantry farms and their heads numbers make up average 5-6 heads of horned cattle, 25-40 heads of sheep and goat [3,4].

In these kind of farms for feeding the cattle animals mainly, the coarse hay, namely stalk of the corn, clover hay, straw and stalks of weeds (wild oat, couch, camel's bur and others), also the grain of corn, barely and others are used. Feeding the cattle animals with forage production that is taken by grinding way causes to increase their fertility and grow, develop well them [2-4].

Nowadays in machine building factories of the Republic the small equipment that grinds the grain, makes forage is not being produced, that is why in small farms some difficulties are coming face to feed the cattle animals with mixed forage.

Available grinders such as DK-4, DKU-1, KDU-2, DKB-1,5 were adapted for large farmers, also their metal, spending energy and price are very high, therefore it can not make opportunity to use these implements in small farms, peasantry farms and private farms. Furthermore, these machines grind the grain straightly as a result the grinding level of the ground forage can not be the same with each other. So, the effectiveness of the forage may be low because of size of ground forage, cattle animals can not digest completely fractions of forage that are bigger (the size of forage is bigger than 2 mm).

In addition, as total defect of rotor grinder and their work organs it might be illustrated that they work at high rotation number, therefore they demand high energy and the balance of the work organs is broken down very fast. Almost all of the produced hammer grinder-crusher machines were adapted to grind and crush straightly.

According to situation of issue and analyze of the done researches until today the above written defect of the hummer grinder-crusher equipment may be arranged by influencing to the grinding grain step by step, namely the supposition was guessed that at first grain is ground, then it is crushed. For this idea the particular grinder should be created, that must break the grain at particular sizes, so it should be provided that grinding, then the ground grain should be crushed according to present requirement and come out. For this, the particular the first part of the grinder rotor should grind the grain, and the second part should crush the grain that ground and it should send the ready ground forage to the out side.

Depending on above written, we carried out researches on development the small sized grain grinder-crusher for farmers and peasantry farms that satisfies its work efficiency and price, it can answer to the present days requirements with together “Navoiy mashinasozlik zavodi” manufacturer plant.

As a result of the researches the constructive and technological scheme of the small sized grain grinder-crusher, the first requirement for preparing first sample and technical task were developed also according to them the constructive schemes of the equipment were prepared.

Thus it should be noted that, the three sized view of the grain grinder-crusher and its constructive schemes were drawn by the special modern technologies on the computer program “COMPAS”.

This gives opportunity the automatization completely to project the equipment and make its some mechanisms, serviced to make easy and fast of work that was done.

The experimental sample of the grain grinder-crusher was created according to its constructive scheme. The length of the grain grinder-crusher is 610 mm, its width is 390 mm, the height is 750 mm, the constructive weight is 150 ± 10 kg, and it consists of two grinding parts. The diameter of the both parts is equal to 300 mm. the diameter of the rotor is 295 mm, the rotation number is 2950 rpm. The grinder bars are installed on rotor in the first grinding part, their numbers are 2 pieces, and width is 50 mm, thickness 6 mm. In the second grinding part the small grinder hammers are installed with hinges on rotor, their numbers are 16 pieces and thickness is equal to 3 mm. The experimental-testing was carried out for purpose of defining the work capacity of the developed grinder-crusher. Nowadays, the grain of the corn and its cob

are used considerably to feed cattle animals, that is why the corn was used as grinding material during the experiment.

According to results that were taken from prime experimental-test the first data was achieved on work quality indicators (look at the table).

Experiments showed that, when the grain of the corn moved through the first grinding part of the grinding-crusher, the grinding level of the grain was that, namely the ground grain that up to 2 mm organized 22,9 per cent, between 2-3 mm was 46,4 per cent, and more than 3 mm was equal to 30,7 per cent.

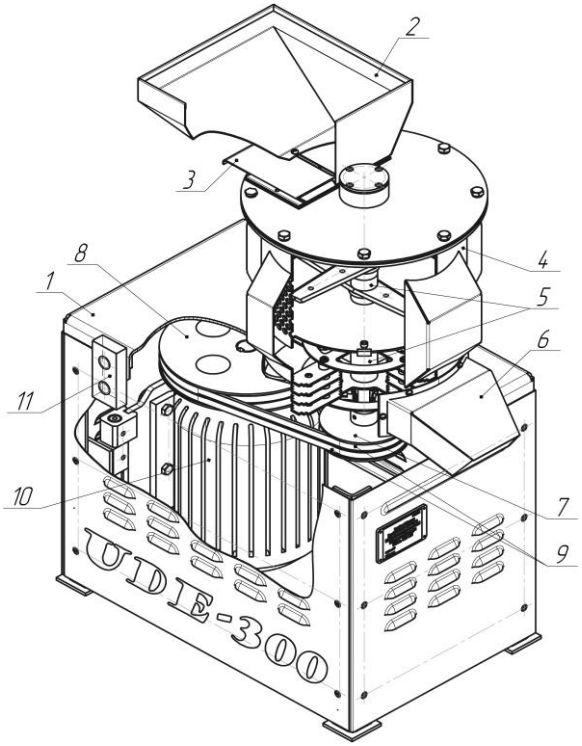

Figure 3. Three sized view of the grain grinder-crusher

1-frame, 2-bunker, 3-measuring bar, 4-grinding part, 5-grinding rotor, 6-unloader spout, 7 and 8-augers, 9-belt, 10- electric motor, 11-switcher button.

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