DOI: https://doi.org/10.5281/zenodo.13865520

ANALYSIS OF EXISTING TECHNOLOGIES AND TECHNICAL MEANS OF PLOWING COTTON FIELDS

[1]Vohidjon Ortikov Bozorboy o‘g‘li
[1]Karshi Institute of Irrigation and Agro-technology at the National Research University “TIIAME”
ortikovv23@gmail.com

ABSTRACT

This article examines the issues of improving the technologies of plowing and processing cotton fields. Studies show that the uneven relief of cotton fields, that is, the presence of furrows and depressions, has a negative effect on the quality of technical equipment. One of the mentioned innovations is the oscillating base wheels developed by K. Isayev, by means of this technology, the coefficient of variation of driving depth is reduced by 2-2.8 times, and the work efficiency is increased by 23.8%. Also, the effectiveness of the method of crushing cotton residues in the field and burying them in the soil is shown: when 5 tons of residues are buried in 1 hectare, the productivity increases by 39.9%, and when 15 tons are buried by 68%. Two-tier plows have been developed for effective soil cultivation; however, their application remains limited when dealing with fields that are free of repeated crops. Fields empty of a number of crops, including corn, sunflower, sesame, cotton, and the like, are difficult to handle with current two-tier plows. But this article emphasizes the need for further improvement of the technical means used in plowing cotton fields. It is mentioned that the lower part of the cotton crop is compacted due to irrigation, and these problems are not sufficiently solved.

Key words: *Cotton fields, cotton stalks, two-tiered plow, soil-deepener, furrow, deeply backfill.*

INTRODUCTION

We all know that the unique and distinguishing feature of cotton fields is that the rough of the relief and the presence of various plant remains or cotton stalk on the surface of the field.

METHODS

Researches have shown that before the soil is turned over, the cotton fields have a clearly visible uneven topography, that is to say, there are rutted and furrows [4]. In cotton fields with a row spacing of 90 cm, the height of the furrow is from 8 to 24 cm, the most common on average is 16-18 cm. In cotton fields with a row spacing of 60 cm, the height of the furrow is from 6 to 18 cm, the most common on average is 12-13 cm.

The presence of such ditches and furrows in cotton fields significantly worsens the quality of technical equipment: the coefficient of variation of the depth deviates from the agro technical permit (Vr = 10%) and reaches 24.8%.

In order to ensure the same depth of overturning, K.Isayev developed a pair of rocky and oscillating type support wheels [2]. This base wheel provide of plough reduces the coefficient of variation of the plow depth by 2...2.8 times, increases the labor productivity of the overturning technical tool by 23.8%.

RESULTS

According to the research conducted: installation of this rocky and oscillating support wheel, the plough coverage width is multiple of the total coverage width, the different loading of the plough bodies cannot be eliminated. This has a negative effect on the balance of the plough movement in the horizontal plane, the overturning of the soil layer, the backfill of plant residues, and the flatness of the field surface [3].

There are several technologies for plowing cotton fields: digging up cotton stalks and taking them out of the field and then plowing the field; crushing the cotton stalks, spreading them on the surface of the field and then plowing; carrying out plowing work at the same time as crushing cotton stalks; plowing cotton fields together with cotton stalks.

Currently, cotton stalks are not deeply backfill (under the soil) when plowing cotton fields with existing technical means, i.e. ploughs. This, in turn, does not have time to be fertilizer the soil during the whole winter period. As a result, it spoils the quality of spring agro technical activities. Taking into account these shortcomings, it is not allowed to plough cotton fields with plows coverage width does not correspond to the width of the rows. In cotton fields, it has been found that it is more beneficial to crush the cotton stalks in the field and backfill them, in the soil than to take them out of the field. For example: when 5 tons of cotton stalks are crushed and backfilled in 1 ha, the productivity of cotton increases by 39.9%, when 10 tons are backfilled by 48%, and when 15 tons are backfilled by 68% [1].

DISCUSSION

In recent years, a number of scientific researches have been conducted in our country and abroad on the technical tools and technologies for processing cotton fields.

It is known to many that two-tier plows are serially produced with a width of 35 cm. When we use these plows on cotton fields with a row spacing of 60 and 90 cm, the quality indicators of this plow deteriorate, due to the fact that uneven relief of the cotton fields.

Scientific Research Institute of Agricultural Mechanization Republic of Uzbekistan scientists A. Tokhtakoziyev and B. Dehkanov suggested that "special cotton stem bend tool" plough plowing cotton fields in front of the first and third upper bodies of the two-tiered plow PD-4-45 for processing cotton fields with cotton stalks [5]. However, this proposed pluw was not put into production, due to the fact that complexity of its design and the fact that its housings were not compatible with the cotton rows.

Bukhara Institute of Natural Resources Management of The National Research University of “Tashkent Institute Of Irrigation And Agricultural Mechanization Engineers” of scientific research was conducted on the topic of “Improving the working process and substantiation of the parameters of the soil-deepener” by Khasanov Ulug Ibrokhimovich. The novelty of this research is that it is possible to ensure the quality of work at the required level with the help of a plow equipped with needle-shaped soil deepeners that soften the wheel track and the plow heel. This proposed plow cannot be used for plowing cotton fields. Because this plow is not designed specifically for plowing cotton fields, the plow consists of 3 bodies, which increases productivity and re-compacts the last softened soil by the tractor wheel.

CONCLUSION

In most of the research works mentioned above, scientific researches and experiments were carried out on the cultivation of cotton fields and backfilling cotton stalks. But during the cotton irrigation period, the lower part of the irrigation ditches becomes very dense and the water and air regime is soured. It was observed that even if other types of crops are planted in the cotton fields, the yield in the traces of this furrow is lower than in other places. In other words, we can see that the work aimed at improving the water and air permeability regime in the subsoil part of the furrows is insufficient.

Based on these analyzes, further improvement of technical tools used in plowing cotton fields, including two-tier ploughs, is one of the urgent problems.

REFERENCES

1. Мухамеджанов М.В *На хлопковых плантациях США.* – Ташкент, 1959. - 54с.
2. Исаев К. *Исследование работы навесного плуга в условиях орошаемого земледения:* Автореферат дисс. …канд. техн. наук. – Ташкент, 1979. - 27с.
3. Матрасулов Р.И. *О влиянии рельефа хлопкового поля на динамику и агротехнические показатели пахотного агрегата // Механизация хлопководства.* - Ташкент, 1980. -№ 5. –С. 3-5.
4. Маматов Ф.М. *Механико-технологическое обоснование технических средств для основной обработки почвы в зонах хлопкосеяния:* Автореферат дисс. …докт. техн. наук. – Москва, 1992. – 33с.
5. А.с. № 191912. *Плуг для глубокой запашки высокостебельных культур* / Ибрагимов Р.И., Рудаков Г.М., Сергиенко В.А., Гарянин И.Н // Бюл.изобр. – 1967. -№ 4. –С.142.
6. Ҳасанов У.И. *Тупроқчуқурлаткичли плугнинг иш жараёнини такомиллаштириш ва параметрларини асослаш:* Автореферат дисс. ...(PhD).техн.наук. – Қарши, 2022