International Journal of
Health Systems and Medical Sciences

ISSN: 2833-7433
Volume 2 | No 2 | February -2023

Peculiarities of Agricultural Workers

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Abstract: The authors analyzed the main stages of cotton cultivation. Information is provided on the impact of key factors of agricultural production on the health of cotton growers. Hygienic measures have been developed to protect the health of cotton workers.

Keywords: cotton growing, microclimate, pesticides, pollination, labor protection.

Relevance

Among agro-industrial workers, cotton occupies an important place - a valuable raw material for the textile, fat-and-oil and other types of industry. [1,3]

The technological process of growing cotton differs from the technologies of growing cereals and other industrial crops. It consists of several stages: soil preparation, seed dressing and sowing, seedling thinning, cultivation, watering plants, chasing, weed, pest and disease control, preparation for harvesting, machine and manual harvesting. Cultivation of cotton begins with the preparation of the soil for sowing: macro- and micro-planning of cotton maps with the help of graders, planners and other mechanisms and plowing. Sowing of cotton is carried out in a square-nested way with special machines - seeders, which are hung on a tractor of the MTZ-80 “Magnum” brand “ORIEN”. Sowing is preceded by seed dressing. After the emergence of seedlings, the crops are thinned out. During the growing season (May-July) 5-6 times are processed between the rows (loosening the soil). More work is done by watering the plants. It is carried out throughout the growing season and ends 2-3 weeks before harvest. [2.4]

A significant amount of work in the cultivation of cotton is devoted to the control of weeds, pests and diseases. The chemical method is widely used for this purpose. In May-August, herbicides, insecticides, acaricides are applied, and in September - defoliants and desiccants. The hygienic features characterizing the use of pesticides in cotton growing are mainly as follows: the use of a significant range of chemicals, simultaneous use over large areas, the combined effect of chemical and meteorological factors (high temperature, solar radiation). The single most time consuming process in cotton growing is the picking of raw cotton. [3,4]

At all stages of the production process in agriculture, the body of workers is affected by physical (temperature, humidity, solar radiation), chemical (pesticides, mineral fertilizers), biological factors. In addition, agricultural labor is characterized by great physical overstrain.

All of the above urgently requires the development of hygienic regulations that guarantee the safety and health of workers employed in cotton growing. [5,6,7]

This issue became especially relevant with the release of the Decree of the President of the Republic of Uzbekistan dated November 28, 2017 No. UP -3608. "On measures to radically improve the cotton industry." [8.9]

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Purpose of the study: to give a hygienic assessment of the working conditions of workers in cotton-growing farms and the development of hygienic regulations for the protection of their health.

Material and research methods.

The objects of the study were the farms "Karvon" of the makhalla committee "Bukhtaroy", "Faiz" of the makhalla committee "Gulistonobod", Shukur-Tukhta of the makhalin committee "Sarmizhan".

The work was carried out jointly with the regional center of the State Sanitary Inspection. The study of physical activity was carried out by the method of sanitary supervision. Air temperature and humidity were measured using an aspiration psychrometer (SanPiN RUZ 0324-16), air velocity - with a wing anemometer) (0324-16), noise and vivration - with a Sumer brand VShV-003 (SanPin RUZ0325-16), air dustiness - by weight by the method (guidelines for the determination of harmful substances in the air), the content of carbon dioxide - by the gas analyzer ANT-3 (MU012-3 / 0015), the determination of the residual amounts of pesticides in the air and soil - by the method of thin-layer chromatography (Kiev -1985).

Research results.

The leading professions in cotton growing are machine operators, irrigators, crop care workers, and cotton pickers.

The microclimate at workplaces was largely determined by the climatic conditions of the area, since almost all types of work were carried out in the open air. It is characterized by a long summer and a rather cold winter, large fluctuations in air temperature both throughout the year and during the day, a significant amount of atmospheric precipitation, which falls mainly in the winter-spring period. [10.11]

The first stage of preparation for sowing cotton was the dressing of cotton seeds. For this purpose, on a specially built concreted area, seeds were treated with phytovac and P-4. All workers involved in seed dressing underwent a medical examination and were provided with personal protective equipment. [3.4]

When preparing the soil for sowing, workers were exposed to low and subnormal temperatures (March-April). The air temperature during the day ranged from +4 + 6C, relative humidity 70-95% and air speed - 4-6m / sec. Under these conditions, the heat-shielding properties of clothing and thermal regulation capabilities turned out to be insufficient (according to a survey of 8 workers from each farm).During the period of cotton thinning (at the end of April, beginning of May), the air temperature in the field fluctuated 21-34 C0, and in the cab of the MTZ-80, KhTZ-80 tractor - from 28-36C0. The highest air temperature was observed during the cultivation period and summer watering of cotton (May - June), at 12:00 and 16:00 it was on average 36.4-38.6C and periodically reached + 41 + 45C0. [12.4]

The effects of high air temperature during work in the summer period of the year were aggravated by the presence of positive thermal radiation from the heated metal parts of the tractors. The temperature in the cab of tractors during this period reached 58-59C0. The relative humidity in the workplace during these works was 50-60%, and the air speed was 2.5-5 m / sec.

All processes associated with soil preparation, cultivation and uprooting of stems were accompanied by the formation of a fairly significant amount of dust. When preparing the soil for sowing during harrowing and plowing of lands in the breathing zone of tractor drivers, the dust concentration ranged from 16 to 21 mg / m3, which exceeded the permissible norm. During the cultivation period (tractor MTZ-80. KhTZ-80), the concentration of dust in the workplace was 14-17 mg / m3.

During winter plowing with the help of the "Mag nim" brand tractor and a 4-body plow, the dust content of the air in the tractor cab was 6-9mg / m3, MTZ-80, T-4, averaged 26mg / m3, with reservations -38 mg / m3.

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When manually picking raw cotton, the concentration of dust in the air of the working area, depending on the distance from the road and the agrotechnical state of the maps, averaged 3.2-13.4 mg / m3, which corresponds to the data of F.T.Dzhumaev (1987). During autumn plowing of the soil with tractors of various brands (MTZ-80, KhTZ-80, T-4) in the breathing zone of tractor drivers, the concentration of carbon monoxide during the period from the leeward side was in the range of 8.4-42 mg / m3, while booking 8.2 -36.1 mg / m3. The development of carbon monoxide poisoning in people working on modern agricultural machines is not observed, however, a number of authors have established that prolonged exposure to relatively low concentrations of carbon monoxide is not harmless. So, according to F.T. Dzhumaev (1987), the level of carboxyhemoglobin in the blood of cotton-growers of machine operators before contact with carbon monoxide averaged 2.5%, and at the end of the work in most of the surveyed, on average, increased to 7.7%.

The tractors used in the cotton cultivation of the workers were exposed to noise and general vibration. So, in the cab of the MTZ-80, KhTZ-80 tractor, the noise intensity reached 109-120 dB. More responsible and laborious work is the work of irrigators. The irrigators were exposed to a whole range of climatic factors: low or high temperatures, solar radiation, winds, precipitation, low or high humidity. When watering in the autumn-winter period, the irrigators were exposed to pronounced cooling effects (November - January). The air temperature during these periods of the year ranged from +7 to - 9 C0. In the spring period (March), the cooling effects were less pronounced, but at this time the water temperature did not yet exceed -3-6 C0, and the air temperature fluctuated 4-6 C in the morning and 18-20 C in the daytime. Significant wind strength was often noted (up to 16-21 m / s). In the summer period, irrigators also worked under unfavorable meteorological conditions, in June-August the air temperature even in the early morning hours reached 30 + 35 C0, 12-16 hours - 42 + 48C0, and at 19-20 hours - 38 + 39 C. High air temperature is combined with low humidity and low air velocity. The workers often irrigated cotton while being in the water of a relatively low temperature (it ranged from 12 to 16 C in June and 18-20 C in July). At the same time, the head and body of the irrigators were exposed to high temperatures and insolation. Thus, irrigators have physiological reactions reflecting the effect of multidirectional influences: the head and body of workers are exposed to intense solar irradiation, the effect of increased and low temperatures. Polivals often complained of joint pain, burning sensation, paresthesia in the limbs, especially at night (21 workers were interviewed). A significant amount of work in the cultivation of cotton fell on the control of weeds, pests and diseases. For this purpose, starting from May to August, “Altin” “Dalate” and “Killer” preparations were used in the fields in all three studied farms. The drugs were used by ground vehicles. Tractor drivers and 2 workers were exposed to these chemicals. No residual amounts of drugs were found in the air 2 hours after treatment. The drugs were found to be unstable in the external environment.

Concluding that workers associated with the cultivation of cotton are exposed to physical (temperature, humidity, air velocity, noise, vibration, solar radiation), chemical (carbon monoxide, pesticides, fertilizers).

Conclusions:

Working conditions in cotton growing depend on the level of mechanization of the cultivated crop, the technology of its cultivation, as well as on the organization of labor. To improve working conditions and protect the health of tractor drivers, it is necessary to introduce modern agricultural machinery in all cotton-growing farms, most of which meet the requirements of occupational health and ergonomics. To reduce noise, the cabins of tractors designated for the cultivation of cotton are sealed. Vibration reduction requires adjustment of the seat to suit the operator's body weight. To reduce environmental pollution and the harmful effects of pesticides on the body of workers, it is advisable to prepare working solutions, mixtures of pesticides and fertilizers at stationary specially equipped points. It is advisable to provide workers with overalls and personal protective equipment for the skin and organs of vision. A more effective measure for protecting the environment from chemical plant protection products is the transition to a biological and agrotechnical method of combating pests and diseases of cotton.

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Of great importance for improving the working conditions of irrigators is the widespread use of means of mechanization of irrigation. In the cold season, overalls should be waterproof and windproof, insulated. In the summer, it is necessary to protect the waterer from insolation and high temperatures (a hat with brim, cotton underwear and light-colored clothing), it is imperative to use special shoes made of waterproof material. In the field camps for workers, it is necessary to organize food rich in proteins and vitamins. A prerequisite for working cotton growers is compliance with the water-salt regime and the organization of hot tea. Further improvement of working conditions in cotton growing is necessary for the organization of comprehensive mechanization of cotton cultivation, as well as automation of technological processes (control of seeding, control of the accuracy of the movement of the unit, drip and sprinkler irrigation).

For the purpose of prevention and timely detection of diseases in persons engaged in cotton cultivation, it is advisable to carry out seasonal and periodic medical examinations.

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