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Main Problems of Occupational Hygiene in Agriculture

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Annotation: Agriculture was, is and will be a strategic support for the state, therefore the problems of attracting the working part of the population to rural areas are decisive. Together with the romance of village life, industrialization makes its negative adjustments to the agricultural sector. Unlike industry, agriculture also lives by biological laws. Here, the main means of production are land and living organisms - plants and animals. The labor activity of workers in the plant growing industry is characterized by the fact that most of the main types of work are carried out outdoors most of the year. At the same time, workers are constantly exposed to a set of meteorological factors, the intensity of which is determined by the climatic zone, season and weather conditions. In addition to the undeniable advantages, the mechanization of processes also reveals disadvantages that can destroy human health. The hygienic feature of the work of livestock breeders also consists in the potential possibility of the occurrence of diseases transmitted from animals to humans. With the transfer of livestock farming to an industrial basis and the use of biological preparations (antibiotics, fodder yeast, protein-vitamin concentrates, amino acids, vitamins),

new types of occupational pathology have emerged, caused by the effects of both biological preparations used as feed additives and microorganisms, including spores of some thermophilic actinomycetes. In general, agricultural hygiene as a science is aimed at studying the effects on the human body of environmental factors and labor processes characteristic of agricultural production, and develops measures to improve working conditions necessary to maintain and strengthen the health of workers.

Keywords: hygienic assessment of working conditions, occupational hygiene, microclimate, medical examination, agriculture, hazardous and harmful environmental factors, maximum permissible concentration, occupational diseases.

Introduction.

Agricultural labor hygiene studies the impact on the human body of environmental factors and labor processes characteristic of agricultural production, and develops measures to improve working conditions necessary to maintain and strengthen the health of workers [1]. The principles and methods of agricultural labor hygiene are borrowed from general labor hygiene, but the specific features of agricultural production are taken into account. The development of agriculture is developing not only according to economic, but also biological laws.

Specific tasks of agricultural hygiene in a given historical period are determined by the nature and level of development of agricultural production. With the change in social formations, the nature of agriculture and its type changed. In pre-capitalist formations, agricultural production was natural. With the development of capitalism, as a result of the social division of labor, it becomes a sector that provides the population with food, and many types of industry with raw materials. The Joint Committee on Occupational Health of the International Labor Organization and the World Health Organization gave the following definitions of agriculture and the agricultural worker: "Agriculture means all forms of work related to growing and harvesting crops, breeding and raising livestock, and caring for gardens and nurseries";

Research and methods.

"Agricultural worker means a person engaged in work, permanently or temporarily, regardless of legal status, in types of work related to agriculture as defined above.

The agro-industrial complex includes two main branches of agriculture - crop production and livestock farming, which form the employment of the rural population. The labor activity of farmers is characterized by the fact that most of the main types of work are carried out outdoors, from early spring to late autumn and partly in winter. Therefore, workers are constantly exposed to a complex of meteorological factors, the intensity of which is determined by the climate zone, time of year and weather conditions [2].

Mechanization of production processes with constant modernization of equipment partially smooths out this problem, but does not solve it completely. Seasonality and urgency of work in

agriculture and livestock breeding determine unevenness of workload on workers during the year, creating great stress in certain periods. With the advancement of agriculture in the northern regions, this feature becomes even more pronounced.

An important feature of agricultural labor is the frequent change of work operations performed by the same person, which is especially pronounced in field crop production. In modern conditions, the most frequently changed auxiliary operations are robotized, in connection with which operator labor has begun to appear in agricultural production [1, 2].

Today, plant growing and livestock farming technologies mainly imply the widespread use of pesticides, mineral fertilizers, growth stimulants, mineral food additives and other biologically active substances. Irrational use of chemical plant protection products leads to pollution of not only the air of the working area, but also the biosphere.

Research on this topic interprets the hygienic feature of agricultural labor in the influence on workers of a complex of meteorological factors, the intensity of which is determined by the climate zone, season and weather conditions. There is also a possibility of diseases transmitted from animals to humans.

With the transfer of animal husbandry to an industrial basis and the use of biological preparations, new types of occupational pathology have emerged, caused by the effects of both biological preparations used as feed additives and microorganisms.

Working conditions in modern agriculture depend on its organization, technology of plant cultivation, level of mechanization, type of machines used. The main category of workers in plant growing are agricultural machine operators. The increasing complexity of agricultural machinery, the increase in machine operating speeds require taking into account the anthropometric and psychophysiological capabilities of a person when designing it. At the same time, increased requirements are imposed on systems of protection from heat and cold, dust, noise, vibration and toxic substances.

During the hygienic assessment of the working conditions of machine operators, it was established that the air temperature in the cabins may exceed the optimal levels. Due to the high temperatures, work is often carried out with open windows, which increases the dustiness of the air in the tractor driver's working area. Soil dust, depending on the type of soil, can contain from 8% to 60% or more of free silicon dioxide. Noise at the machine operator's workplace depends on the nature of field work, humidity and density of the soil. The concentration of carbon monoxide in the cabin can reach 29.2 ± 6.8 mg / m3 (MPC 20 mg / m3), and hydrocarbons up to 162.9 ± 26 mg / m3 (MPC in terms of carbon 300 mg / m3). The levels of noise and vibration, dust and gas contamination of the air in the cabins increase as the service life of the machines increases [1, 2, 3]. Long-term exposure of machine operators to a complex of unfavorable factors can lead to the development of occupational diseases. The most common are lumbago, lumbosacral radiculitis, auditory neuritis, vibration disease, and chronic bronchitis. The leading forms of diseases with temporary disability among agricultural machine operators are respiratory diseases, injuries, and diseases of the peripheral nervous system. Reduction of dust content in the breathing zone is achieved by sealing cabins, ventilation, and systematic wet cleaning of the workplace. In order to prevent the ingress of dust-containing air from outside, excess pressure is created in the cabin. Special filters are installed in air conditioners. The degree of air purification in them can reach 98%. Air conditioners used on tractors in many cases make it possible to bring the microclimate parameters of cabins closer to the requirements of hygienic standards [4, 5]. Good cabin sealing and excess pressure inside it prevent harmful chemicals from entering the air of the working area. Cabin sealing has reduced the dustiness of the air in the working area by 8-10 times and virtually eliminated the entry of harmful gases into the breathing zone. The use of tractors not equipped with cabins in work involving the use of pesticides is prohibited.

The arrangement and maintenance of premises of livestock farms, regardless of the type of

livestock, with the exception of the area and cubic capacity per head of cattle, are subject to fundamentally the same hygienic requirements. The site for the farm should be selected on an elevated place, with good drainage for water, close to a green area and a water supply source at a distance of at least 200 m from residential buildings [4, 5, 6]. The walls of the premises should be plastered and whitewashed, the floors should be warm. Natural lighting is achieved through light openings with a light coefficient of 1: 10-1: 12, artificial - by electric lamps located in a checkerboard pattern, at a distance of 5 m from each other. The required illumination during milking is 75 lux, during feed distribution - 10 lux [6]. Measures to improve working conditions in animal husbandry include equipping livestock buildings with effective ventilation systems that remove air from the lower zone of the building, and especially from manure channels, systematic cleaning and disinfection, and providing workers with special clothing, footwear, and other personal protective equipment. A two-shift work schedule is physiologically rational for machine milking operators [7]. Livestock farm workers must observe personal hygiene rules. Livestock complexes must have sanitary facilities with cold and hot water supply, a sanitary checkpoint with showers, rest rooms and women's hygiene rooms, and a toilet with a washbasin. Particular attention should be paid to creating healthy and safe working conditions on farms, in teams and units working on the principles of lease and family contracting [8].

Important measures to improve working conditions in animal husbandry include rational preparation of the main technological processes and equipment, reduction of the length of transport lines, sealing of equipment at feed mills and in workshops, primarily conveyors, dispensers, crushing and grinding machines, general exchange supply and exhaust ventilation, and mechanized cleaning of premises [9]. The most dangerous work is the removal of silage from storage facilities. Strict compliance with safety regulations is necessary - long repeated ventilation of storage facilities with open hatches, special instructions for workers, and the use of hose gas masks.

The implementation of state sanitary supervision in animal husbandry is carried out in close contact with the veterinary and sanitary service. The result of this is the constant improvement of technological processes, improvement of working conditions, prevention of environmental pollution, and reduction of morbidity among workers in agriculture.

Result and discussion.

Medical examinations play a significant role in preventing the development of general and occupational diseases among agricultural workers [9]. Machine operators, livestock breeders, feed production workers, as well as those engaged in the cultivation and primary processing of industrial crops such as cotton, hemp, hops, workers in agrochemical complexes exposed to pesticides, mineral fertilizers, and other harmful production factors are subject to preventive medical examinations.

Working conditions in agriculture largely depend on the technology of cultivation of agricultural crops. Such branches of plant growing as sugar beet growing, vegetable growing, gardening, viticulture, tobacco growing are characterized by a wide variety of methods and ways of performing labor operations, many of which are carried out manually. It is believed that the most labor-intensive process is harvesting. In greenhouses, vegetable growers and machine operators work at high temperatures and air humidity and minimal air mobility.

Greenhouses pose an increased risk of exposure to pesticides for workers. More than 80% of work in greenhouses is done manually, of which about 50% of the work is classified as medium to high severity.

Among plant growers, respiratory diseases, diseases of the peripheral nervous system and female reproductive system occupy the first place among diseases with temporary disability [1, 2, 3]. In the structure of morbidity of vegetable growers and machine operators working in greenhouses, the main share falls on diseases of the respiratory system, nervous system and sensory organs,

skin and subcutaneous tissue, genitourinary organs and circulatory system. The level of liver and bile duct diseases among greenhouse workers is 3 times higher than the corresponding indicator among workers in open-ground vegetable growing.

In animal husbandry, one of the most labor-intensive processes is milking cows [10]. Milkmaids may have characteristic hand diseases and lumbosacral radiculitis. Machine milking makes labor easier and increases its productivity. However, even with machine milking, such operations as cleaning and washing milking machines and moving them require significant physical effort. When distributing feed, especially dry feed, the amount of dust containing microorganisms increases sharply. The microflora of livestock buildings usually consists of saprophytic and opportunistic forms - proteus and intestinal bacteria; sometimes golden and white staphylococci, hemolytic streptococci, and mold fungi are found. The concentration of gases and dust in the air of the working area, as a rule, does not exceed the maximum permissible levels. The degree of microbial contamination of the air depends on the method of keeping animals, the season, the cleanliness of the livestock buildings and their disinfection. The number of microorganisms in 1 m3 of air can reach hundreds of thousands, the number of fungal spores - several thousand. One of the pronounced unfavorable factors of production

The natural environment of livestock breeders is characterized by a specific unpleasant odor, which arises due to the presence in the air of mercaptans, indole, skatole, amines, aldehydes, ketones, ammonia, carbon disulfide and other substances formed during the decomposition of manure and feed residues [11].

In feed mills or in workshops that are part of large livestock complexes, feed is enriched with various biologically active substances that can also negatively affect human health. Workers there may be exposed to complex dust, cooling or heating microclimate and noise. High dust concentrations may be created near crushing and grinding machines when loading raw materials, as well as in areas where finished products exit. Dust may enter the air of the working area due to poor sealing of screws, dispensers, granulation presses, etc. Residual amounts of pesticides contained in raw materials, as well as microorganisms and fungi, are found in the air [12].

When ensiling corn, sunflower and other silage crops, various unsafe preservatives are used. As a result of microbiological and biochemical processes, the plant mass is fermented, which is accompanied by the release of so-called silage gas containing carbon dioxide, nitrogen oxides, aldehydes, essential oils, etc. Since those working in animal husbandry are affected by a complex set of factors, the most pronounced of which are: biological (bacteria, fungi, wool, fluff, feathers, etc.), chemical (ammonia, hydrogen sulfide, silage gases) and physical (noise, high humidity). The most frequent forms of diseases with temporary loss of working capacity in livestock breeders are diseases of the respiratory system, cardiovascular system, peripheral nervous system and musculoskeletal system, diseases of the skin and subcutaneous tissue, in women - gynecological diseases, which are fourth in frequency, second only to respiratory diseases, diseases of the musculoskeletal system and skin. Even in conditions of mechanization of milking processes, machine milking operators experience neuromyositis and polyneuropathy of the upper limbs. In poultry farm workers who are provided with categories [13], the main place in the morbidity structure is occupied by respiratory diseases and diseases of the peripheral nervous system. More often than in other professional groups of agricultural workers, they experience allergic diseases caused by sensitization of the body to biological factors. Contact with sick animals can lead to the development of diseases such as brucellosis, anthrax, tuberculosis and others. Also, disease carriers such as rats, whose lice are poisoned with special preparations, pose an increased danger to livestock breeders [14].

The purpose of this article is to focus and accentuate some negative components of agricultural production. Plant growing and livestock farming are some of the labor-intensive areas where, under certain circumstances, almost all harmful production factors can be combined simultaneously. The health of people and the availability of personnel in these industries fully

depend on a comfortable microclimate on livestock farms and the rational organization of labor during the complex performance of work.

Industrialization and specialization of agricultural sectors were at one time aimed to a greater extent at increasing labor productivity, which indirectly solves issues of organization and problems of occupational hygiene [15, 16]. Thus, using the example of one of the farms of the Knyagininsky district of the Nizhny Novgorod region, area, as an experiment and comparison, we measured the microclimate parameters at livestock facilities. To measure the microclimate parameters, we took two cowsheds with different livestock housing systems. Measurements were taken in the cold season three times a day. The following physical and biological microclimate indicators were determined - air temperature, humidity, air speed. The gas composition of the air was also determined.

Conclusion.

Microclimatic standards for farm animals and service personnel are, of course, different. Table 1 shows that a number of indicators for animals deviate significantly from the standard values. We emphasize that people work on farms under such conditions. Temperature and humidity in both cases significantly exceed the maximum permissible level. The slight excess of ammonia in the air during tethered housing was influenced by the fact that manure was removed from the premises once a day. Microclimatic conditions of livestock premises depend, first of all, on the method of heating, ventilation, thermal conductivity of enclosing structures, the number of animals, and the climatic zone. Since the location of the experiment is located in the middle zone, the climate is considered moderately cold in winter. Therefore, in accordance with sanitary and hygienic requirements for temperate latitudes, livestock facilities must be equipped with a ventilation system with air heating [17]. In this case, there was no such system on the farms, so there is a deviation from the norm. Unfortunately, due to cost savings during construction, most similar facilities at many enterprises have such shortcomings. High thermal conductivity of enclosing structures, lack of a ventilation system with air heating, lack of vestibules, crowding or, conversely, underoccupancy of premises, etc. As a result, workers in the industry find themselves in unfavorable conditions.

There may be different ways to solve this problem. As recommendations for this situation, we suggested the following. Insulate the enclosing structures on both farms, since the walls were frozen along the entire perimeter. Clean manure from the tethered system at least twice a day. Machine milking operators, guards, and cattlemen must be fully provided with special clothing [18, 19] Equip a full-fledged rest area for workers with changing rooms, toilets, and showers. Since the enterprise milks three times a day, it is desirable to organize a two-shift daily routine with a more rational work and rest regime [20].

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