Use of endemic plants in dairy cattle breeding in the Middle Amur region

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Abstract. Preservation and maintenance of high productivity, reproductive capacity, productive longevity, and vitality is an urgent task of dairy farming. Modern dairy farming is characterized by a high level of mechanization of all production processes, a large concentration of animals in a confined space, constant exposure to various stressors against the background of increasing environmental pollution. This implies an increase in the adaptive abilities of the animal organism. The situation is aggravated by the transfer of animals to low-component rations and year-round stall keeping without active movement. The main role at the present stage of dairy farming development belongs to the strengthening of the fodder base and the organization of rational feeding of cattle. Only complete feeding ensures the practical realization of the genetically determined level of animal productivity, thereby contributing to the further increase in the efficiency of animal husbandry. Considering the problems of increasing the production of animal products in the conditions of the Khabarovsk Territory, the most important of them should be noted: increasing the biological value of the diet of animals by enriching the missing components. Due to the fact that the compound feed imported from other regions of Russia to the Far East does not always correspond to the required quality, chemical composition and nutritional value, therefore, in the Far East region, to increase the biological value of the animal diet, it is possible to use additives from local plant resources containing in its composition is a whole complex of biologically active substances, macro- and microelements. Domestic and world practice has convincingly proved that the use of biologically active substances in the feeding of animals and poultry makes it possible to obtain more products from them while reducing feed costs. Taking this factor into account, we have carried out studies on the use of flour from the roots and stems of the high teapot as a source of biologically active substances in the feeding of farm animals, as well as an alcoholic extract of the roots of the fox. Positive changes were noted in the experimental groups. During the reference period, the preparations of the high lure helped to stimulate the reproductive function of cows after calving, led to an earlier fertilization of cows and an increase in milk productivity during the milking period.

1. Introduction
An imbalance in diets for vital elements, a low level of feeding, a reduced quality of basic feed, a mismatch of the conditions of keeping animals with the physiological needs of the body against the background of an increase in the productive potential lead to metabolic disorders, to the emergence and development of pathological processes in the reproductive sphere, impaired reproductive function and early culling, and the greatest loss of offspring is associated with the death of embryos [1-2].
Most metabolic disorders occur in highly productive dairy and beef cattle. Signs of manifestation of these violations are an increase in barrenness, the birth of a weak offspring, a decrease in resistance to infectious diseases, live weight, productivity, deterioration in the quality of the products obtained. All of this ultimately leads to the premature culling of animals. As a result, the productive life of cows in highly productive herds has been reduced to critical values - 1.5-1.7 calving. Animals drop out of the herd in the most productive period, when they should receive the greatest amount of milk, or even before its onset [3-4]. According to L. Peshchuk, the duration of the use of animals less than 2.5 lactations leads to the fact that cows-mothers will begin to leave the herd before giving birth to their daughter. In this situation, the herd ceases to exist as an integral biological system. Mother cows leave the herd before they give birth to their daughter. This leads to the self-liquidation of the herd as a single biological system [5]. Dairy farming in the Far East region has low indicators of economically useful traits, including high barrenness and a short period of economic use of cows - on average, less than three lactations [6].

For the first time, veterinary medicine faced a massive manifestation of the borderline state of animal health, when the body, according to Avicenna, is "not healthy and not sick." Under existing conditions, it is advisable to revise the traditional views on the organization of veterinary care and animal feeding. For this, you can use the available means of natural origin. Among them are biologically active substances contained in plant extracts [7-9]. Natural fodder from wild plant resources can be used as an alternative to traditional synthetic antibiotics, which is quite relevant lately, because, along with solving the problems of realizing the genetic potential of productivity of farm animals and poultry, laid down in breeding work, agricultural producers face an important task of creating conditions for the production of environmentally friendly products with improved consumer properties. Since almost all farm animals and poultry can transfer nutrients from compound feeds necessary for human nutrition into products, its quality and consumer properties can vary depending on the composition of the feed rations. In this regard, interest has increased in the study of the use of natural plant (phytogenic or botanical) supplements in diets containing a complex of biologically active substances, allowing to obtain environmentally friendly products and not provoking the development of a large number of "medicinal diseases" that arise after treatment, including those transmitted through egg, milk and meat [10].

In the last decade, domestic and world practice has arguably proved that the use of biologically active substances in the diets of farm animals makes it possible to get more products from them while reducing feed costs. One of the solutions to this problem is the use of local natural fodder resources in the diets of farm animals, which make it possible to optimize the animals need for scarce nutrients and reduce the cost of fodder per unit of production and raising young animals [11]. The experience of using plant extracts in livestock practice shows that their full and rational use allows you to preserve and increase the livestock population, reduce the consumption of expensive chemotherapeutic agents, antibiotics and vitamins, and, therefore, reduce the cost and improve livestock products. They show themselves well in order to prevent, treat and improve the productive and reproductive performance of animals. This makes it possible for farms to reduce the cost of purchasing products from the chemical, microbiological, hydrolysis and other types of industry [12-13].

In this aspect, of undoubted interest in the conditions of the Middle Amur region are endemic medicinal plants, numbering more than 1000 species, including the famous Araliaceal family: real ginseng (Panax ginseng CA Mey), Eleutherococcus senticosus Maxim, Aralia manch Aralia mandshurica Rupr. Et Maxim), high bait (Echinopanax elatum Nakai), sessile acanthopanax (Acanthopanax sessiflorum Seem), seven-lobed calopanax (Kalopanax septemlobus).

In connection with the above, we carried out experiments on the correction of reproductive function and increasing the milk productivity of cows after calving with preparations of high enticement. Below is the characteristic of the high lure (Echinopanax elatum Nakai).

Zamaniha high - a shrub 0.5-3.0 m high, with lodging, rooting stems, with ascending aerial shoots, up to 2 cm in diameter, slightly branched, with numerous brittle thorns. Leaves are alternate, 5-7-lobed, large, rounded, up to 30 cm in diameter on long, hollow petioles. The leaf blade is bright green,
wrinkled, there are sparse thorns on top, on the bottom - with thorns along the veins and along the edges of the leaf and with spiny hairs. Blooms in June-July. The flowers are small, bisexual, yellowish-green, collected in simple umbrellas, which form a brush-like apical drooping inflorescence up to 20 centimeters long, densely covered with rusty-brown bristly hairs. Fruits ripen in August-September, spherical fleshy drupes 7-12 mm in diameter, leathery, with two bones. The color of the fruit is bright or yellow-red.

The main value of the zamaniha lies in long cylindrical roots with few thin roots. They contain alkaloids and triterpene glycosides, essential oil (2.7%), coumarins (up to 0.2%), flavanoids (up to 0.9%), resinous substances (up to 11.5%), and mineral salts. The complex of biologically active substances makes up 6.9% of the mass of air-dry roots, represented by the sum of saponin-echinokosides. The roots contain macronutrients (mg / g: K –12.30; Ca –34.60; Mg –2.70; Fe –0.46, as well as trace elements: manganese, copper, zinc, cobalt, strontium aluminum, barium, vanadium, selenium, nickel, lead, iodine. The plant concentrates selenium, barium, strontium.

In terms of the amount of biologically active substances, the first place is occupied by stems (9.5%), then roots - 8% and leaves - 7%. This makes it possible to rationally use a limited supply of natural raw materials. According to L. Vostrikov et al., The annual root collection limit is no more than 10 tons. Sukhomirov G.I. [14].

2. Materials and methods
The work was carried out in different years at dairy farms in the Khabarovsk Territory. The experiments were carried out by the group method, taking into account the age at calving, the level of previous productivity, and live weight. The animals were kept in the same conditions of feeding and housing, adopted in each farm. The first experiment was carried out in the autumn-winter period 2015-2016 in JSC "Danilovka". For this, 20 new-calving black-and-white cows were selected. Three groups of 10 heads were formed as the calving progressed during the months of January-February, taking into account the age at calving, the level of previous productivity. In the first experiment, the difference consisted in the fact that the cows of the first experimental group, starting from the second day after calving and for 30 days, were given an infusion of flour from the stalks of bait, collected after the autumn collection of roots, with feed. The dose of flour is 50 gram per head. The required amount of flour for each day was poured with boiling water in a ratio of 1:10 and left in a sealed container for about two hours. Then they were mixed with compound feed and fed to the cows before milking.

The animals of the second group were similarly given 100 gram of flour from the stalks of bait.

The third group served as a control; cows additionally received a similar amount of compound feed to the general economic ration.

In the second experiment, carried out in the winter stall period of 2016-2017, at JSC "Zarya", the animals during the first 10 days after calving were drunk with water an alcoholic extract of the roots of zamaniha at a dose of 0.1 ml per kg of live weight. Animals of the control group (22 heads) the same amount of 70% alcohol, diluted in 1000 ml of water.

In the winter stall period 2017-2018 at the dairy farm LLC "Sergeevo" conducted a comparative assessment of flour from the roots and stalks of bait according to a similar scheme of the first experiment. The cows of the first group were fed 100 gram of flour from the stalks, and the second group was fed 50 gram of high flour from the roots of zamaniha. The third group of animals served as control.

The reproductive ability of cows was assessed by the method of I.I. Homeland [15]. Throughout the entire accounting period (100 days), according to the results of control milking, which were carried out monthly, the milk productivity was taken into account individually from each animal. The mass fraction of fat was determined in the average milk sample.

Laboratory studies were carried out in the laboratory of the Dal Research Institute of Agriculture. All the material obtained was processed by the biometric method according to N.A. Plokhinsky [16] (table 1 and 2).
Table 1. Milk productivity indicators, 2015-2016 (M ± m).

| Group                | Index                              | Experienced I       | Experienced II       | Control           |
|----------------------|------------------------------------|---------------------|----------------------|-------------------|
|                      | Gross milk yield of natural fat content, kg | 1399.0±46.67        | 1423.5±42.08         | 1277.7±37.81      |
|                      | Average daily milk yield of natural fat content, kg | 13.99±0.25          | 14.23±0.29           | 12.77±0.51        |
|                      | Gross milk yield of 4% fat, kg     | 1373.82±37.8        | 1393.6±40.2          | 1275.8±52.0       |
|                      | Average daily milk yield of 4% fat | 13.74±0.81          | 13.94±0.67           | 12.76±0.8         |

Table 2. Milk productivity of cows, 2016-2017 (M ± m).

| Group                | Index                              | Control       | Experienced |
|----------------------|------------------------------------|---------------|-------------|
|                      | Gross milk yield of natural fat content, kg | 1542.3±54.67  | 1785.8±46.65|
|                      | Average daily milk yield of natural fat content, kg | 15.42±0.90    | 17.86±0.80   |
|                      | Gross milk yield of 4% fat, kg     | 1468.27±55.17 | 1702.76±37.8|
|                      | Average daily milk yield of 4% fat | 14.68±0.85    | 17.02±0.79   |

3. Results and Discussion
The data of the first experiment showed that the drug zamanhi contributed to the improvement of the reproductive function of cows. The period from calving to the first hunt was 53.2 ± 6.0 and 46.1 ± 7.0 days, respectively, in individuals of the 1st and 2nd groups and 59.4 ± 4.1 in the control group, and the service period was 79.5 ± 7.3 and 67.8 ± 6.3 days. The inclusion of flour from the stalks of zamanhi into the diet of cows during the first month after calving led to earlier fertilization of cows (on average by 10.4 and 22.1 days) compared to the control.

The data of the registration of the milk productivity of cows carried out monthly during the entire accounting period (100 days) after calving with the determination of the fat content in the average milk sample are given in table 1, which indicate an increase in the milk productivity of cows in the experimental groups during the milking period by 121.3-145.8 kg of natural fat milk and 98.2-117.8 kg of four percent fat, respectively, in relation to the animals of the control group.

In the winter stall period of 2016-2017, at the state farm of JSC Zarya, Khabarovsk region, 20 Holstein cows during the first 10 days after calving were drunk with water an alcoholic extract of the roots of bait at a dose of 0.1 ml per kg of live weight. Control animals (20 animals) have the same amount of 70% alcohol diluted in 1000 ml of water.

The results of the experiment testify to the positive effect of the alcoholic extract of the roots of the high tempest on the body of fresh cows. The period of isolation of lochia was on average 19.5 ± 5.1 days in the experimental group, in the control group - 22.3 ± 4.6 days. The first hunt began, respectively, 58.2 ± 6.1 and 68.6 ± 7.7 days after calving. The duration of the service period decreased by 46.1 days (from 192.8 ± 14 to 146.8 ± 13). The difference is significant at P <0.05; td = 2.43. Thus, the alcoholic extract of the roots of zamanikha high significantly improved the studied indicators of the reproductive function of cows and made it possible to inseminate animals 46.0 days earlier. The milk productivity of cows in the first 100 days of lactation increased on average in the group by 243.5 kg from 1542.3 kg in the control to 1785.8 kg in the experiment, the increase is significant at P <0.01 (table 2).

10 days after the end of the drug administration, blood was taken from 4 cows from each group for analysis. Analysis data indicate positive changes in the morphological composition of the blood of the experimental animals: hemoglobin 112.7 ± 0.5 g / l; erythrocytes 6.95 ± 0.1 10^{12} / l; leukocytes 8.67 ± 0.2 10^{9} / l. In the control, respectively - 103.8 ± 1.4; 6.1 ± 0.1; 8.15 ± 0.1 (P<0.1).

An increase in the content of erythrocytes and hemoglobin in the blood of animals of the experimental group indicates a more intensive metabolism in their bodies, a better ability to absorb oxygen during respiration, supplying organs to them, which is especially important during the period of intense lactation activity. An increase in the content of leukocytes indicates the activation of the body's defenses and is consistent with the literature data. The ratio of calcium and phosphorus in the...
blood was 2.39: 0.99. All the studied indicators characterizing the physiological state of animals indicate positive changes in the body of cows in the experimental group under the influence of an alcoholic extract of the roots of high teat.

In the winter stall period of 2017-1018, a comparative assessment of flour from the roots and stalks of high lure was carried out at the dairy farm of LLC Sergeevskoye in the Khabarovsk region according to the same scheme of the first experiment. The cows of the first group were fed 100 g of flour from the stalks, and the second group - 50 g of flour from the roots. The third group of animals served as control. Cows of all groups were kept in the same conditions of keeping and feeding. The number of cows in each group was 10 heads, selected on the basis of analogues. Due to the refusal of some of the animals to eat the steamed flour of the roots of zamanihi, they began to mix it with grinding oats or barley in dry form.

According to the data of primary zootechnical registration, the first insemination of cows on average in groups was carried out after 58.3 ± 3.4; 55.1 ± 2.7 and 64.5 ± 4.0 days after calving. The duration of the service period was respectively 76.3 ± 4.1; 68.8 ± 3.2 and 93.2 ± 5.3 days in the groups receiving flour from the stems, roots and the control group.

Studies have confirmed the positive effect of high lure on the reproductive capacity of cows and have shown the advantage of roots despite the dose reduced by half. Three cows from each group were tested twice a month later. By the amount of hemoglobin in the blood, animals of the experimental groups at the end of the first month after calving exceeded their peers who did not receive herbal stimulants by 7.5 and 9.3%, by the number of erythrocytes by 7.8 and 11.9%, which indicates an improvement in metabolism substances. This is also indicated by the increased content of total protein in blood serum by 0.39%, 0.59%, respectively.

4. Conclusion

The data of experiments on the study of the effect of high sediment preparations on the productive and reproductive indicators of cows after calving, carried out in different years and different farms on black-and-white and Holstein cows, allow us to recommend high sediment preparations to stimulate the reproductive function of cows after calving and increase milk productivity in milking period. Studies have confirmed the previously established fact in other members of the Araliev family - eleutherococcus prickly, acanthopanax sessile-flowered - the dependence of biological activity on the dosage form and plant parts.

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