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AN ECOLOGICAL SIGNIFICANCE OF PHEROMONES

Abstract: This article describes the essence of the concept of “pheromones” and their biological significance. The variants of their application in agriculture to struggle against insects-pests are presented in the article. The definition of interpretation is given and two classifications of pheromones and their types are presented: pheromones of insects, pheromones of vertebrates, sexual pheromones, pheromones “anxiety”, trace pheromones, epidemic pheromones and their functions and significance for the representative’s organism and for the environment as a whole.

Key words: ambivalence of chemical matters (pesticide), pheromone, volatile chemo signals, biological markers, communication, insect-pests, dispensers, specific response, behavioral response, pheromones of insects, pheromones of fish, pheromones of vertebrates, pheromones of human, pheromones of plants.

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Introduction

The 21st century has become a representative stage in the achievement of mankind on high indicators in various fields: in the economy, politics, and health care. However, these achievements could not affect negatively to the change in the ecological situation of our planet. Gradually, it began to change and there is a destruction of natural processes in various ecological systems at present and subsystems. Questions of environmental safety within one or several regions have undergone a transformation and have become global problems, not only in one country, but for all mankind now.

In this situation, the problems of coordinating of human impact on the biosphere are actual, finding safer and more natural alternative means of pest control, creating favorable environmental conditions, and achieving harmony in the “man-environment” system are becoming increasingly relevant. In this regard, the President of the Republic of Uzbekistan Sh.M. Mirziyoyev, speaking at a meeting of the heads of state of the founders of the International Fund for Saving the Aral Sea, noted that it is necessary to begin to introduce environmentally friendly technologies, to lay the foundation for the comprehensive introduction of a green economy, environmentally friendly,

energy- and water-saving technologies. The head of state also have become as an initiator of the organization of a conference next year with the support of the UN, the World Bank, the Asian Development Bank and the Global Environment Facility, which will hold talks on practical issues of creating a zone of environmental innovation and technology in environmentally disadvantaged regions of the world [1]. In the strategy of action on five priority directions of development of the Republic of Uzbekistan for 2017-2021 years in subparagraph 3.3. The modernization and intensive development of agriculture refers to the implementation of investment projects for the construction of new ones, reconstruction and modernization of existing processing enterprises, the widespread introduction of intensive methods in agricultural production, primarily modern water and resource-saving agricultural technologies, the use of high-performance agricultural equipment; expansion of research work on the creation and introduction into production of new breeding varieties of crops that are resistant to diseases and pests, adapted to local soil, climatic and environmental conditions, and animal breeds with high productivity [2].

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One of the main factors that have become the root of the destruction of the environmental situation is chemical intervention. The role of chemicals is ambivalent. In other words, in addition to their function in controlling pests, diseases and weeds of crops, one should not forget that they are organic compounds that are toxic not only to harmful organisms, but also to human. In this regard, much attention is paid to the development of the agricultural sector, the means and methods that are used here. New approaches are needed to protect plants and food supplies from pests, which would be safer in relation to humans, to protect object and the environment. It is an essential to note the role pheromones [7]. Pheromones are chemicals released into the environment by some organisms and cause specific reactions in other organisms that perceive them [3].

Pheromones are one of the types of external stimulus that affect the behavior and physiological state of human and animals, a complex of special olfactory signals. These are biological markers of their own kind, volatile chemo signals that control neuroendocrine behavioral reactions, developmental processes, as well as processes related to social behavior and reproduction. Pheromones contribute to a change in the behavior, physiological and emotional state or metabolism of other individuals of the same species. A group of German researchers led by Adolf Butenandt discovered pheromones first. Today, pheromones are widely used in agriculture [4]. In combination with traps of various types, pheromones that lure insects can destroy significant amounts of pests. Classifications of pheromones are very diverse. One of the most common classifications is the following: insect pheromones, plant pheromones.

Pheromones of insects. Pheromones are used by insects to deliver a wide variety of signals. Ants, for example, use pheromones to indicate the distance traveled. Separate odors are used by ants to signal a danger, which provokes either flight or aggressiveness in individuals.

Human pheromones. Pheromone production is associated with the apocrine glands (AG) of the skin, with the secrets of other glands and with the micro flora of the skin. A high concentration of AG was found in the axillary region, which is considered an important organ for the production of human odor [4]. The sense of smell of a person is able to solve the problem of distinguishing and recognizing people by individual smell and, in particular, allows you to recognize genetically close relatives by smell. The possible role of the individual smell of a man in expressing a woman's spouse or sexual partner is expressed. Smells can control mood and performance, and their impact on the work of programmers is of particular importance. The second classification of pheromones is represented by a group of the following pheromones: sexual pheromones, aggregation pheromones, "alarm" pheromones, epidemic

pheromones, and territorial pheromones. Sexual pheromones are a means of communication between sexual partners. Being isolated individuals of one gender, they evoke behavioral responses in individuals of the other gender that promote mating [8].

Pheromones of aggregation determine the concentration of both genders for various purposes. Pheromones of "anxiety" cause a reaction of flight, harboring, or, conversely, an aggressive reaction and a collective attack on the enemy. Trace pheromones, which are a kind of "path". Epideictic pheromones differ from territorial pheromones when it comes to insects. Fabre observed and noted that "the females that lay their eggs in the fruit also precipitate mysterious substances in the immediate vicinity of the eggs, which serves as a signal for other females of the same species that they should lay their eggs in another place" [5]. Some plants give off anxiety pheromones when animals graze on them, which lead to the formation of tannin in neighboring plants. These tannins make plants less appetizing for herbivores. Many wild plants emit pheromones at a time when pests begin to damage their leaves. These substances attract the natural enemies of insects - even we can smell these smells at a time when our neighbors are cutting their lawn. Some plants attract pollinating insects not with delicious nectar, but with cunning. These include, for example, orchids. The bizarre shapes of the petals and sepals of some species resemble the pollinators themselves - bees, butterflies or flies. So, an orchid flower from the genus of *Ophrys* resembles a bee, a bumblebee or a fly sitting on it, and also emits pheromones of female insects. Having noticed such an orchid, the male pollinator tries to mate with the flower. Of course, it cannot do this, but pollen adheres to it, which the male then transfers to another flower [3]. There are two main ways to use pheromones against insects. The essence of the first is that it is possible to attract an insect with the help of a pheromone and destroy it before it can detect a natural source of pheromone. The second way is to saturate the air with synthetic pheromone and thereby prevent the insect from finding natural sources of pheromone [5]. Another side of the possible use of pheromones is the establishment of the species composition of insects in a specific field. This can be most clearly seen with the scoop.

The analogues of sexual pheromones of many species of scoops were synthesized. The synthesis sample was used in the research institute of Uzbekistan. The observations were carried out in the cotton crop rotation of three farms in Yangiyul district of Uzbekistan, as well as on the fields of the Research Institute of Vegetable and Melon Crops of Tashkent region. We used pheromones of winter scoops of two- and three-component, an exclamation scoop, black scoops, bindweed scoops, cotton scoops, meadow scoops. Dispensers with pheromones were placed in

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trihedral traps made of laminated paper, which were placed in the fields at the rate of 1 trap per 1 ha at a height of 25 cm above the plants. Every 10 days, dispensers are updated. The observations were carried out for three years in the fields of cotton, kenaf, corn, alfalfa, red pepper, tomatoes, pumpkin. In the examined fields of cotton crop rotation (cotton, kenaf, corn, alfalfa), the scoop complex determined using the available pheromones is generally of the same type [8]. However, in some years there were differences that related mainly to small species. So, in all areas, the dominant species was the bindweed scoop, subdominant - exclamation and winter. On the cotton field, bindweed, winter, exclamation, cotton, meadow (*Mythimna unipuncta*) scoops, as well as gamma scoop, S-black scoop, ipsilon scoop, were identified. The species diversity of the scoop on the corn field was slightly less: there was no cotton scoop and ipsilon scoop. On the alfalfa field, all types of scoops were identified whose pheromones were used. On the fields of vegetable crops were also found all types of scoops, pheromones of which were used during observations, except caradrin and leaf corn scoops. On vegetable crops in Tashkent region, the number of scoops was generally higher than the fields of cotton rotation in Yangiyul district.

According to available data, catching an average of one trap per day (night) of 5 or more moths of winter moths is considered to be a generalized

economic threshold of severity, which corresponds to a density of tracks of 2.6 - 4.0 individuals per 1 m². With the help of pheromones of other scoops, a high number of other species was also established that are as harmful as the winter scoop; the total number of identified scoops far exceeded the generalized threshold of severity established for only one species [4].

Thus, the use of analogues of sexual pheromones makes it possible to establish the species composition of scoops in the fields of various crops, as well as to identify the total number of pests in a separate field and signal the need for protective measures to regulate their numbers [6]. In both cases, the vital functions of the insect will be impaired, especially reproduction.

Recently, an adaptive agricultural system has become increasingly relevant, which will reduce the consumption of anthropogenic energy and activate the vital activity of all beneficial organisms that make up the agro ecosystem.

A large role we can count the useful insects as entomophages. They will help reduce the use of technogenic pollutants to the required minimum, and therefore, maintain equilibrium in nature.

The data in the article will increase students' professionalism and overall environmental culture, which in the future, in the process of teaching them biology, will affect the formation of the worldview of the younger generation.

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