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ADVANCING UNDERSTANDING OF INTRODUCED AMARANTH MEDICINAL PLANTS: MORPHOBIOLOGICAL FEATURES, APPLICATION INNOVATIONS, AND PEST INVESTIGATIONS

Yuldasheva Shokhista
Associate Professor, Department of Zoology and General Biology,
Fergana State University, Fergana, Republic of Uzbekistan
E-mail: shodiyevamubina97@gmail.com

Gulbakhoroy Shodieva
Master's Degree Student, Department of Zoology and General Biology,
Fergana State University, Fergana, Republic of Uzbekistan
E-mail: shodiyevamubina97@gmail.com

Mohidil Abduvalieva
Student of the Department of Food Technology,
Fergana Polytechnic Institute, Fergana, Uzbekistan
E-mail: hojialiqurbonov413@gmail.com

ABSTRACT

This article presents a comprehensive exploration of introduced amaranth medicinal plants, focusing on their morphobiological properties, innovative applications, and advancements in pest research. Amaranth species have garnered increasing attention in recent years due to their medicinal properties and nutritional value. Through a synthesis of scientific literature and research findings, this paper offers insights into the morphobiological characteristics of introduced amaranth species, including their morphology, anatomy, and physiological traits. Furthermore, the article delves into recent scientific innovations in the application of amaranth medicinal plants. From traditional medicinal uses to modern pharmacological applications, amaranth species have demonstrated promising therapeutic potential in various health conditions. The paper highlights emerging trends and breakthroughs in the field, shedding light on novel formulations, dosage forms, and therapeutic approaches. In addition to exploring the medicinal properties of introduced amaranth species, this article examines recent advancements in pest research related to amaranth cultivation. Pests pose significant challenges to amaranth production, affecting yield, quality, and sustainability.

KEYWORDS

Amaranth, Insect, Beet sap, Morphobiology, Control measures, Medicinal plants, Application innovations, Pest research, Therapeutic potential, Crop resilience.

By elucidating the biology, behaviour, and management strategies of key pests, researchers have developed innovative approaches to mitigate pest damage and enhance crop resilience.	

Introduction

577 of the 4230 species of plants in our country are medicinal plants. The amaranth plant, which belongs to the "Gultojikhoroz" class, is a unique medicinal plant known in our country since ancient times. During the time of Abu Ali ibn Sina, it was used to treat skin diseases (for example, measles, red rash, etc.). there is information about the widespread use of amaranth in the treatment of cuts and wounds, halitosis and other diseases [1-3].

The word amaranth is derived from the ancient Russian Slavic words "mara (amrita) - death", and "a - denial" and means "denial of death" or "eternity". In Greek, "amáranthos" is formed by adding the prefix "a - negation" and the words "maraíno - to wither" and "anthos - flower", literally meaning "flower that does not fade". (dried amaranth keeps its shape for 3-4 months). In ancient Slavic medicine, amaranth was used as an anti-ageing agent. Central American peoples - Incas and Aztecs, ancient Etruscans and Hellenes also considered it a sign of eternal life [4-8].

Amaranth later spread around the world to North America, India and Asian countries, reaching China. Currently, it is widely popular as a cereal and vegetable plant among the mountain people of India, Pakistan, Nepal and China. This plant, which has been cultivated in European countries, such as Russia and Ukraine, is widely used in medicine, cooking, cosmetology, industry, agriculture and other sectors of the national economy. It is also grown as an ornamental plant in some countries for its colourful flowers and leaves. It has 65 varieties and more than 900 species.

In the past, amaranth was grown mainly as an ornamental crop in our country. The red amaranth variety called "gultokhoroz", reminiscent of a rooster's crown is widespread in our country [9].

The Main Part

To date, 19 varieties of amaranth have been introduced in local conditions, and the varieties "Uzbekistan-M", "Andijan", "Marhamat", "Ulug'nor" based on the varieties of amaranth Kharkovskiy-1, Helios, Ultra and Lera by the method of natural selection was created, it was recognized as a selection achievement, a patent was ordered under these names, and the relevant patents were issued. Possibilities of amaranth cultivation on degraded lands with high salinity and ultimately the dynamics of decreasing soil salinity are being tested in practice [10-13]. The reduction of the salinity level of the earth, and the fact that it creates enough opportunities for the cultivation of other technical plants, also shows the economic efficiency of this plant [14-17].

The beet aphid (Aphis fabae Scopoli) was first mentioned in 1763 by the Italian naturalist DA Scopoli in his "Carniolic Entomology". Later it was recorded in Western and Eastern Europe, Asia, Africa, and North and South America. Bean aphid in Russia for the first time AK Mordvilko in 1987. Several Russian, Soviet and foreign scientists devoted their works to the study of various aspects of his life activity. The insect is distinguished by the fact that it is highly harmful to its host plants, and it is polyphagous; It damages 35 types of cultivated and wild plants belonging to 14 families. It also feeds on amaranth, corn, potatoes, sorghum, hemp, beans, squash, tomatoes, and alfalfa. The growth of

infected plants slows down, the leaves are deformed, rolled into a tube and turned yellow. The weight of sugar beet roots can be reduced by 20-69%, tops - by 20.4-23.7%, and sugar content - by 0.7-1.7%. The loss of seed yield in beet planting can reach 85%. When large colonies of bean weevils feed on beans, bean number can be reduced by 43%, grain yield by 54.5%, and 1000-grain weight by 23.7% (Figure 1).

Figure 1. Beet juice

Beet leaf aphid primarily damages the inner, young leaves, causing them to curl and curl; This leaf curling occurs around the aphid colonies on the underside of the leaves. As the number of aphid colonies increases, the damage increases, especially in dry conditions.

They form a wingless aphid, up to 2 mm long, completely black or dark green with short antennae and lighter-coloured legs. Sometimes, some people develop white spots on the top of their abdomen. This usually happens when the wings develop.

The aphid usually lives on the underside of the leaf and reproduces very quickly. Later generations, i.e. winged forms of the disperser, but mostly wingless individuals, breed in the summer. In autumn, winged forms emerge and fly to winter host plants, where they become wingless females. Later, winged males emerge and fly to winter houseplants to mate. In mild winters, the beet leaf aphid can survive the entire winter on its host host plants.

Figure 2. The affected part of the leaf

In addition to beets, the beet aphid damages about 200 species of plants belonging to the legume family, Asteraceae, Solanaceae, squash, etc. The body of wingless virgins is 2-2.5 mm long, ovoid, greenish-brown or black with a waxy coating. A binary life cycle. Preimaginal development occurs in 8-15 days. In April, a mass hatching of larvae occurs from the eggs, producing parthenogenetic females. They

live 40-52 days, and the fertility of one individual is 25-30 larvae. It feeds on leaves, producing two generations mainly on the undersides and flower parts of the primary host. From mid-May, it transitions to a secondary host (sugar beet, beans, broad beans, vetch, potatoes, and other cultivated and wild plants). Migration takes 8-15 days. By this time, beets already have 3-4 true leaves. The insect feeds on the underside of the leaves along the veins and forms large colonies. By the end of July, when the beets are ripe and coarser, the object will be transferred to the weed plants.

Control measures

Mainly in agrotechnics: weed control; compliance with agrotechnical technology of crop cultivation; and timely forecasting of the time and abundance of pests. The main condition for preventing the appearance of bean aphids in crops prone to damage is the correct agricultural technology in perennial cultivation. First of all, it is not necessary to follow crop rotation and plant the same type of plants for several years in a row. At the end of the season, it is necessary to completely clean the area of old seedlings, dig them up, apply fertilizers and insecticides. Spring softening of the soil is also useful for future planting.

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