

## **REVIEW OF CONTROL METHODS FOR *AMBROSIA ARTEMISIIFOLIA L.***

*Ambrosia artemisiifolia L.* is an invasive weed species that was introduced from South America to the European continent in the nineteenth century. Since the 1940s, it has been actively spreading across central Europe via logistics routes of cars and trains [3]. The main threat posed by ragweed is the high level of pollen allergenicity and relatively rapid and effective adaptation to new habitat conditions, which is why it competes for territory and nutrients with local wild and cultivated species [2].

Ragweed seeds can remain viable for up to 40 years, so controlling this weed is a complex process, as it can return to cleared areas at any time [1]. For this reason, controlling ragweed populations requires annual monitoring.

To avoid the negative consequences of the spread of *A. artemisiifolia*, including reducing its negative impact on the biodiversity of native species, various controlling ragweed population methods are being developed. The experience of using the methods used in Ukraine and abroad to regulate the number of ragweed populations is of theoretical interest and great practical importance.

Various methods are used to control ragweed. They can be divided into those suitable for use in agroecosystems and urban ecosystems. Some methods can be combined. It should be noted that before starting ragweed control measures, it is recommended to cover exposed skin, respiratory tract, and eyes, as the plant's pollen is a strong allergen [4].

Methods that can be used in agroecosystems:

1. The chemical control method has long been used as one of the most effective. However, despite this, in most countries that are part of the European Union, there are already restrictions on herbicide usage due to their negative impact on all other plants and animals that eat treated plants [8]. These factors directly threaten public health. Therefore, due to the risk to human health, this method should be utilized only in agroecosystems.

2. The US uses the method of crop genetic modification in tandem with the chemical method. Monsanto's Roundup Ready crops are highly resistant to

glyphosate-based herbicides (a chemical phosphate compound). The series includes varieties of corn, soybeans, legumes, rapeseed, cotton, alfalfa, and wheat [8]. The disadvantage of this method is the use of herbicides, which are deadly to bees.

Methods that can be used in the urban ecosystem and combined with agroecosystem methods:

1. The mechanical method of ragweed control is mowing, cutting, plowing, and other mechanical manipulations with plants. The ragweed should be cut as low as possible, or the plant should be completely uprooted from the soil, always with the root system. This method is necessary to use before flowering, from July to August. Plants that do not bloom or bear fruit can be dried and composted. To prevent the shoots from sprouting again, they should be stored in conditions where contact with the soil is not possible. The uprooted shoots have to be placed in plastic bags together with the soil in which they grew. The bags must be disposed of by incineration or dumping in a garbage can [4]. The mechanical method is effective in both agroecosystems and urban ecosystems.

2. Mulching is the covering of the soil with straw or humus, pebbles, gravel, and recycled tree pruning waste, which will protect the soil from adverse environmental factors, including weed germination. It is important that the mowing procedure and subsequent mulching be done before the development of ragweed inflorescences [6].

3. The biological method involves the use of phytopathogenic fungi from the genus *Phyllachora* [5], or phytophagous insects that feed on ragweed: *Epiblema strenuana*, *Ophraella communa*, *Tarachidia candefacta*, *Zygogramma suturalis*. However, researchers note that it is not yet possible to control the number of these insect populations, which significantly reduces the effectiveness of the method. In addition, most species of gerbils and voles eat ragweed seeds, which are rich in oils [7], and this can reduce the soil bank of ragweed seeds.

4. A modern, effective, and, most importantly, safe method is the phytocenotic method. Its essence is plowing the soil with shredded plant residues, followed by sowing perennial cereal-legume grass mixtures or lawn grasses. Such artificially created stands of perennial plants, especially those that form a turf cover, effectively suppress the further growth of ragweed [5]. The advantages of the phytocenotic method are its relative cheapness, durability, and the possibility of combined use in agro- and urban ecosystems.

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