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Advantages of using aviation in agriculture

The agricultural sector of Ukraine is significantly changing with implementation of innovative technologies in growing crops. The same tendency is characteristic of plant growing, and as a result, the correlation of the volumes of different works, in particular the agricultural and aviation works, shifts greatly.

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The aerial application of pesticides has several advantages for the modern agricultural producer. When properly managed, aerial application offers speed of dispersal, accessibility to crops on which ground equipment cannot operate, and reasonable cost. In many cases, the advantages also include more timely applications and, therefore, better utilization of pesticide materials. You can cover large areas quickly. You can treat crops or areas (such as mid-season corn or forest stands) for which ground equipment isn't suitable; and the application cost per acre is comparatively low.

Aerial application, commonly called crop dusting, involves spraying crops with fertilizers, pesticides, and fungicides from an agricultural aircraft. The specific spreading of fertilizer is also known as aerial topdressing. Agricultural aircraft are often purpose-built, though many have been converted from existing airframes. Helicopters are sometimes used, and some aircraft serve double duty as water bombers in areas prone to wildfires. Aerial spraying can be used to treat large areas quickly and, unlike ground spraying, can be carried out when field conditions prevent wheeled vehicle access, which enables the timing of spray treatments to be improved and soil compaction reduced. There are however, certain disadvantages associated with aircraft spraying. High wind speed and temperature inversion may limit treatment application whilst trees, waterways, environmental considerations and overhead power lines may also prevent some fields from being treated. Accurate deposition in dense crop canopies can also be more difficult to achieve with aircraft. Volatility and spray drift can be a problem with aerial spraying and environmental contamination can be significant if spraying is incorrectly executed.

Integrated Pest Management (IPM) A general definition of IPM is: a pest management approach that uses all available techniques in an organized program to suppress pest populations in an effective, environmentally sound and economical manner. These techniques can include cultural controls, biological controls, pest resistant crop varieties, pheromones and pesticide applications.

An IPM is based upon the concept of prevention by using sound planning and good management to prevent or minimize pest problems. Instead of applying

pesticides according to a spray schedule or time of year, treatments in an IPM program are made only when monitoring inspections show that they are required. This eliminates unnecessary pesticide use and can also reduce the cost of managing the pests.

Performance of agricultural and aviation works enables timely and even application of agrichemicals, plant protection products, desiccants and defoliates decreasing the pesticide pressure on plants and soil, rearing beneficial entomophages to protect plants and prevents disturbance of crops during utilization of ground equipment.

In result, the access in crop grown only for grain equals to 30%, whereas for other crops the access equals to 25% of their average crop yield which supports operating profits from agricultural aviation and provides funds for the state budget.

Currently in Ukraine “No-till” farming is gaining extended application. The “No-till” system can be referred to as self-renewable. “No-till” is defined in English exactly as “no-tillage”. “No-till” technology excludes tillage and all other kinds of mechanical disruption of soil to create a seedbed. Seeding is carried out over the crop residues into uncultivated land. Thus, to comply with the requirements, protective measures are to be taken using aircraft. No-till is the most reasonable approach to farming justified from the point of view of ecology and economics.

In this case, any mechanical disturbance of soil is eliminated, which means that at the stage of preventive measures for plant protection aviation should be applied. Agricultural and aviation works are used to control plant diseases, in weed and pest control, desiccation of sunflower, fertilization of crops with liquid complex and bulk fertilizers during the vegetation period, foliage application, dissemination of trichogramma by air. Long-term practice of agricultural aviation application proved that aviation mode meets the same level of biological and economic productivity as the land mode and even exceeds it.

Certain factors limit the utility of aerial application. These include: inclement weather, the presence of fixed obstacles, target site size and shape limitations, the intrinsic chemical properties of certain pesticidal active ingredients, ferry distance (the distance between the application site and place where the aircraft is refilled and serviced), and the general public’s misconceptions about aerial application of any pesticide.

In Ukraine, a fixed trend has emerged to apply the No-till technology with a main principle of minimizing the mechanical influence on soil, and exactly agricultural and aviation works take over the major share in this activity.

According to the type and purpose of the works and application of chemicals, agricultural and aviation works are categorized into four groups: pest control and control of crops diseases; weed control; fertilizer dressing; and defoliation of crops. Such classification of agricultural and aviation works corresponds to their field of application and simplifies their planning, analysis, etc.

The selection of aircraft is an important first step in the management of an aerial application project. The successful applicator must know a great deal about the aircraft’s capabilities and limitations to ensure the task can be carried out safely and effectively. Generally, aircraft selected should be as versatile as possible, allowing use for a wide variety of application work with the most economical cost

per hour. The choice may be between a variety of fixed- and rotary-winged aircraft. While there has been a number of fixed-winged aircraft specifically designed for aerial application, this is not the case with rotary-winged aircraft.

References

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