

Organic (ORGANIC) farming

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Farmers in Europe have been applying artificial fertilizers since the mid-1920s, and synthetic pesticides since the beginning of the Second World War. These products soon had an adverse impact on agrocenoses and ecosystems and as early as 1940 Dr. Hans Müller, a Swiss, coined the motto: "Healthy soil, healthy food, healthy people", which is extremely relevant even today. After the 1950s and 1960s the world population grew rapidly and in many regions of Africa, Asia and elsewhere tens of millions of people were starving, and hundreds of thousands of children and adults were dying from malnutrition, hunger and disease. During this period, with the aim of increasing agricultural production, mainly in some socialist countries, agricultural enterprises were enlarged and production was concentrated and specialized. To increase yields, the use of artificial fertilizers rose sharply, and the protection of agrocenoses from pests was carried out through the massive application of pesticides, including those with a cumulative effect.

This approach to crop cultivation adversely affected agrocenoses and ecosystems in various aspects – pollution of surface and groundwater, reduction of soil fertility and the health status of crops; reduction of biological diversity, limitation of the activity of natural pest regulation; contamination of soil, air and water with pesticide residues; contamination of plants and their produce and, along the food chain, damage to human and animal health; reduction of soil fertility through the decrease of beneficial soil and rhizosphere microflora and fauna; destruction of soil structure and facilitation of erosion processes; deterioration of the soil water-air regime and the conditions for plant development, etc. To increase animal productivity, feed additives, growth regulators, hormones and others began to be applied.

As an alternative to the massive application of pesticides against pests, as early as 1946 the first integrated plant protection programme in apple was created (in Bulgaria such a programme was established in 1967 also against apple pests). In 1962 the book by the American biologist Rachel Carson “Silent Spring” was published as a public reaction to the total application of pesticides, including those with a cumulative effect. A few years later a large part of these products were banned in many countries, and Bulgaria was one of the first among them. In the 1980s and 1990s genetically modified hybrid cultivated plants were bred with high productivity and resistance to pests, but with unknown impacts on the health of humans, mammals and other animal and plant organisms. These “achievements“ of genetics also triggered public discontent in many countries and organizations.

As a response to the high chemicalization and industrialization of agricultural production, in 1972 in Germany the International Federation of Organic Agriculture Movements (IFOAM) was established – Sarapatka et al. (2009). In 1991 the EC issued Regulation 2092, which defines the conditions for organic farming in all EU countries, without adapting the texts to national legislation. The Regulation covers unprocessed plant agricultural products and processed products for human consumption containing at least one component of plant and animal origin. In accordance with Regulation 2092/1991, in organic farming for the production of an individual product or its ingredients, strictly defined requirements and rules are observed:

- The use of synthetic pesticides, artificial fertilizers, genetically modified organisms, growth regulators and feed additives is prohibited.
- Pest control is carried out through appropriate soil tillage, crop rotations, resistant varieties and by creating favourable conditions for biological control agents.
- Soil fertility is maintained through green manuring, farmyard manure and other organic residues from farms and through the application of mineral fertilizers of natural origin; animals must have sufficient free space and be supplied with adequate feed from a defined area.

The process of organic production is subject to control. Organic farming is defined as a “System for improving the natural fertility of the soil, the biological diversity of species and the ecological balance of the environment“. In Bulgaria a large part of the legislation on organic farming is regulated in Ordinance No. 22/04.08.2001 of the Ministry of Agriculture and Forestry and Ordinance No. 35/2001 of the Ministry of Environment and Water,

relating to organic production of plants, plant products, foods of plant origin and their labelling. Regulation 2092/1991 was valid until 31.12.2008, harmful insects and mites.

In apple and pear orchards more than 100 species of parasitoids and predators and 21 species of entomopathogenic microorganisms inhabit; in plum, peach and cherry orchards, respectively 80 and 15 species, and in vineyards – more than 110 species of parasitoids and predators and more than 10 species of entomopathogenic microorganisms. Many biological agents are mass-reared and ready-made products of bioagents are offered, and products of mineral origin (sulphur and copper) are also permitted; there also exist and are permitted products of plant origin. Against the most harmful pests of fruit crops, synthetic sex pheromones can be successfully used for disorientation of male individuals or for monitoring; viral products alone or in combination with synthetic sex pheromones; bacterial products based on *Bacillus thuringiensis*, etc. There are already many varieties of vegetable and fruit crops that are tolerant to pathogens and pests, including soil nematodes.

Against winged forms of aphids, whiteflies, thrips, cherry fruit fly, hairy beetle and other harmful insects, visual (sticky) traps, coloured differently depending on the pest species, can be successfully applied. In fruit crops and vineyards, various physical and mechanical measures can be successfully applied. Organic farming requires conviction, perseverance, conscientiousness, knowledge of the biology and ecology of the crop and the pests, of their control and of the legislation.