



## Best technologies and practices for adapting raspberries to climate change

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## PILOT PROJECTS

Priority	1	2	3	4	5	6	7	8
	Cultivation					Processing		Marketing
High (TOP 8)	Agrovoltaics	Precision and drip irrigation	Hail and rain protection films	Hydroponics	Geodesic dome greenhouses	Green ammonia	Water recycling	Marketing
Medium	Nets + films for the garden					Non-HFC technologies		Certification
	Aeroponics					Rainwater harvesting		
	Varieties adapted to the region					Eco-friendly packaging		
	Zero tillage					Off-grid power supply		
	Vertical farms					Carbon credits		
Basic	Mulching					Biogas		Export
	Field buffer strips					Biofuel		
	Eco-friendly drainage system					Electric transport		
	Reduced use of pesticides					Reusable packaging		
	Crops resistant to diseases and pests					Green manure		
Regions								
High	8 regions identified							
Basic	Other regions							

Plant protection, reducing pesticide use



+

Finance



## EARLY WARNING SYSTEM

- A set of technical equipment designed to detect threats or emergencies at an early stage of their development and to promptly alert staff and the public in the risk zone.
- It includes various sensors, alarms, monitoring and control devices, as well as audible, visual and voice warning systems.

**The main objective is to prevent the occurrence of an emergency or minimise its consequences by automatically detecting hazardous parameters and promptly informing those responsible and the public**



## EARLY WARNING SYSTEM FOR RASPBERRIES

- Growing in polytunnels requires control of temperature, humidity and ventilation.
- An early warning system can help to detect dangerous changes in climatic conditions (such as overheating or sudden cold snaps) in good time, allowing measures to be taken promptly to safeguard the crop.
- It is also possible to monitor the status of irrigation or ventilation systems to prevent breakdowns

**Specific prices for early warning systems in Ukraine depend on the equipment package, the scale of the facility, the type of sensors and the level of automation. Generally, such systems include:**

- **process sensors (temperature, humidity, gases, motion, etc.);**
- **signal reception and processing devices;**

## COVER CROPS

Cover crops are an effective adaptation measure aimed at protecting the soil from erosion, conserving moisture and improving its fertility.

Types of cover crops:

- **Legumes (clover, alfalfa, vetch):** Fix nitrogen and enrich the soil.
- **Cereals (rye, sorghum):** Suitable for weed control and improving soil structure.
- **Vegetable crops (turnip, radish):** Used to break up hard soil and control weeds.



## COVER CROPS FOR RASPBERRIES

### The best cover crops for raspberries

1. White clover
2. Phacelia
3. Ryegrass
4. Vicia
5. Mustard

### Best avoided

1. Tall grasses (competition for water)
2. Aggressive perennial grasses
3. Crops with a strong root system.

Cover crops are used for raspberries to protect the soil, improve its structure, reduce weeds and add nitrogen. However, it is important that they do not compete too strongly with the raspberries for water and nutrients.

## MULCH MIX FOR RASPBERRY ROWS

### Composition of the mixture

- 1 White clover – 20–30%
- 2 Perennial ryegrass 30–40%
- 3 Phacelia 10–20%
- 4 Spring vetch – 10–15%
- 5 Timothy grass – 5–10%

**Sowing rate – 20–25 kg/ha**



Has gained popularity in Germany and Poland

## COMPOSTING

- Composting is an effective method of producing organic fertilisers by processing organic waste.
- In aerobic composting, oxygen is used to break down organic matter, ensuring a rapid process and high-quality compost free from pathogens and harmful microorganisms. Materials used for composting include manure, straw, leaves, plant residues, etc.
- In large berry farms, raspberries themselves are often composted — old canes after pruning.
- This allows up to 30–40% of nutrients to be returned to the plantation.

### Results of using compost

After 2–3 years:

- humus ↑
- soil structure is significantly improved
- raspberry yield often ↑ **by 15–25%**



## COMPOSTING

- Composting requires significant investment: setting up a site for processing and storage, obtaining approval from environmental authorities, and purchasing equipment (loaders, aerators, mixers).
- The initial costs are substantial — **from 6 million UAH to produce 10,000 tonnes** of compost per year.
- The economic benefit lies in reduced costs for synthetic fertilisers and increased crop yields thanks to improved soil structure and moisture retention.
- High-quality compost costs around **2–2.5 thousand UAH/tonne**, vermicompost — **4 thousand UAH/tonne**.

NULEP of Ukraine



## PEST-RESISTANT CROPS

- Crops resistant to diseases and pests are a key focus in modern Ukrainian agriculture.
- The use of such crops helps to reduce the use of chemical plant protection products and improve the resilience of agriculture to diseases and pests.

### Principles of use:

1. **Genetic resistance:** selecting plant varieties that are naturally resistant to specific diseases and pests.
2. **Breeding work:** Developing new varieties with increased resistance to diseases and pests through selection and hybridisation.



## RASPBERRY VARIETIES. RESISTANT TO PESTS AND DISEASES

**Sugana:** a remontant raspberry variety with high yields and disease resistance.

**Price:** 98 UAH for 2 seedlings. <https://agro-market.net/ua/catalog/item/7664/>

**Cascade Delight:** a variety with high yield and resistance to root diseases.

**Price:** 36 UAH per seedling. [https://biosad.ua/catalog/sadzhantsi-yagidnih-roslin/sazhentsy-maliny/krupnoplodnaya-malina/malina-kaskad-delajt?srsId=AfmBOooOOZMd7JDkC41WDTs3je0NZxvgiLR-egBS1VDVUoeSTjy\\_LecW](https://biosad.ua/catalog/sadzhantsi-yagidnih-roslin/sazhentsy-maliny/krupnoplodnaya-malina/malina-kaskad-delajt?srsId=AfmBOooOOZMd7JDkC41WDTs3je0NZxvgiLR-egBS1VDVUoeSTjy_LecW)

**Karamelka:** a remontant variety with high yields and disease resistance. **Price:** 67.41 UAH per seedling.

<https://yaskravaklumba.com.ua/ua/shop/product/malina-karamel-ka>



## NO-TILL (ZERO-TILL AGRICULTURE)

- A modern farming system that involves abandoning traditional ploughing.
- Special seed drills cause minimal disturbance to the soil cover, only at the point where the seeds are sown.
- Mulch may be used.
- The soil surface is constantly covered with a layer of shredded plant residues (mulch), which protect the soil from erosion, retain moisture and gradually turn into organic fertiliser



## NO-TILL FARMING IN RASPBERRY CULTIVATION

1. **More moisture** (Mulch can reduce evaporation by 30–50%).
2. **More humus**
3. **Fewer weeds** (Mulch + cover crops can reduce weeds by up to 70–80%).
4. **Better soil biology** (Increased populations of: earthworms, mycorrhizae and beneficial bacteria).

### RESULTS (BASED ON BERRY GROWERS' RESEARCH)

1. **Raspberry yield** ↑ 10–25%
2. **herbicide costs** ↓ 60–80%
3. **Soil moisture** ↑ 20–30%.

#### EXAMPLES OF EQUIPMENT AND THEIR COSTS

- Remsintez SICH-6 Pro No-Till pneumatic grain drill – 1,265,000 UAH
- Used John Deere 1750 8-row pneumatic seed drill with No-Till system – \$35,000

## HAIL AND BIRD NETS

- Hail and bird protection nets are used to protect crops from damage caused by hail and pests such as birds.
- Hail protection nets are made from polyethylene monofilament using a special weaving technique that ensures increased strength and wear resistance. They protect crops from damage caused by hail and wind.
- Bird nets are made from ultra-lightweight polymer and feature an optimally sized mesh that allows light and air to pass through whilst preventing birds from accessing fruit and berries.



## Hail and Bird Nets for Raspberries

### Hail nets

Material:

- HDPE polyethylene
- UV-stabilised

Standard mesh size: 5–8 mm

### Bird netting

Material:

- HDPE polyethylene (UV-stabilised)
- Nylon, polypropylene

Mesh size is usually: 15–20 mm

Nets are installed on:

- metal or wooden posts
- cables or wire
- structure height 2.5–3 m

The system resembles a garden trellis with a mesh roof.

**The cost of the complete system is \$8,000–20,000 per  
hectare**

## PROTECTIVE SYSTEMS FOR ROWS

- Protection systems for each row of plants involve the use of a combination of film on top and netting underneath, as well as arched structures.
- This technology provides individual protection for each row of plants against adverse weather conditions and pests.
- The film on top protects against rain and hail, whilst the netting underneath provides protection against insects and small animals.
- This design allows the microclimate to be regulated and ensures optimal conditions for plant growth.



## PRICE

The cost of protective systems can be relatively high due to the complexity of their design and the need for manual labour during installation.

Anti-hail nets: from 4,855 UAH <https://plants-club.ua/zakhyst-vid-hradu>

Bird netting: from 17 ₴/linear metre to 6,350 ₴ for large rolls  
<https://agrodolina.com.ua/ua/g9883811-zaschitnye-setki-ptits>

Protective films: from 375 UAH per roll <https://fazenda.net.ua/ua/katalog-tovarov/teplichnaya-plenka-1/>

# PROGRESS

Promoting Green Deal Readiness in  
the Eastern Partnership Countries



# THANK YOU FOR YOUR ATTENTION!

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