

Developing methods to avoid frost injury in berry plants

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Harmful spring frosts

- Flowers are susceptible to low temperature stresses (LTS)
- Pollination is inadequate and flowers are damaged: crop and quality losses
- Spring frosts occur nearly every year in northern areas
- Damages are controlled by fibre cloth on strawberry, and sprinklers
- Sprinklers use high amounts of water: waterlogging in soil
- With earlier springs risks for frosts increase
- Need for new solutions in frost control in changing conditions



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Theoretical background of the method

- Under air temperatures lower than +4°C, the heat radiation of ground and plants decreases the temperature of plants below 0 °C.
- Clouds and dense fog reflect heat radiation back to plants
- Fog and light rain with very small drops on the plants are most effective in frost control
- Temperature decreases to +0 °C > fog starts> after 1-2 hours the temperature of plants has risen 1-2 °C, because there is no heat radiation

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Fog is hanging in cold air layer near the ground in conditions of radiation frost. Simulation with paint sprayers



Results

- Technical innovation developed to make mist from cold water
- Fog and small water drops are produced vertically by a fog nozzle
- The device is a cyclone nozzle working at 5-10 atm water pressure
- Water consumption 20-25 ml/min/nozzle
- 100 devices for one hectar and water use by 5 atm pressure is 150 l/h/ha (500 l with 10 atm)
- Technical solutions without moving components
- Works with normal water system pressure
- Final testing in autumn 2014

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