

The Igloo Effect[™] of The Pulsator 205

Mitigates frost damage to crops at minimal cost



Report From the Field



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The Valencian company, Control de Heladas, led by the farmer from Calet, Carlos Arenes, distributes The Pulsator 205 for frost control in Southern Europe and North Africa. It is sold separately in the U.S. and South America.

For a minimal cost per hectare (acre), The Pulsator 205 combats low temperatures and protects crops from frost thanks to the Igloo Effect that covers crops with a thin, protective layer of ice.

It is well known that frost causes great losses in fruit tree and wine grape crops. The solution to frost is to insulate the plants by creating a thin, protective layer of ice on your orchards and vineyards. Protecting the flower buds and leaves from frost mitigates crop loss.

The Pulsator 205 technology makes use of the Igloo Effect to protect fruit trees and vines from frost.

The Pulsator 205 system is based on water pulsators that accumulate flow up to the point of tension and releases water in an area of up to 35m² or 380ft².

The micro-sprinklers of The Pulsator 205 are used to wet the entire area. The Pulsator 205 is connected to a self-compensating dripper and a rotating head that turns it into a low-flow, long-range micro-sprinkler. This system causes various effects on the tree or plant:

- **The crop receives the Igloo Effect which turns ice into a protective and insulating layer of shelter for crops by conduction when applying water on it.**
- **Once freezing temperature is reached, the formation of ice begins to cover the crop. It is at that moment when the Igloo Effect begins to occur, converting the ice into a protective layer.**
- **The ice layer becomes an insulator that prevents heat loss by radiation and convection.**

Interview with Mr. Carlos Arenes,
Agricultural Frost Control Manager, Control de Heladas.

In which crops can this system be implemented?

Unlike other high-application frost control systems, this system can be applied to all crops, both deciduous and evergreen, avocados, citrus, and mangos. It is also applicable to deciduous crops, such as blueberries, cherries, apples, etc. Since the application rate is not too high, the ice remains lightweight and there are no branch breaks, loosening, over-saturated soil, or flooding.

Up to what temperature would we be covered?

It is a very complex question since no two frosts are the same and there are very important factors such as relative humidity and wind, which are two causes of evaporation and our main enemy. In avocados with temperatures of -4.5°C (23.9°F) we have not had any damage on covered buds and fruit, however the non-wetted branches were completely burned by the frost.

In vineyards, we have recorded temperatures of -7°C (19.4°F) without any damage, in nectarines -8.4°C (16.9°F), and cherry temperature -8.6°C (16.5°F) wet temperature without any damage to buds, flowers, or fruit.

What minimum flow rate is needed to control frost?

Standard drip irrigation system flow rates provide more than enough flow to control frost, between 1.0 and 1.3mm per square meter/hour.

What is the minimum working pressure?

The minimum pressure is 1.5 Bars (20 psi) at the end of the field. This is the pressure necessary for the Pulsator 205 to open and close the silicon membrane that makes the pulses.

When should the system be started on a freezing night?

You should start the system at 2°C above zero (35.5°F) or when you are certain that it will freeze at your property. But always start an hour before the risk of frost since the higher the humidity, the less risk at low temperatures and the less losses due to evaporation. In this way we create a microclimate with 100% humidity by constantly applying water throughout the frost. It must be taken into account that when the land is saturated with water, the heat loss by radiation is much lower. With this, we ensure that the temperature inside the area of coverage, where we are applying the water, is never lower than -1.8°C (28.7°F) and in the area that we cover with ice, the temperature is never lower than 0°C (32°F).

At what temperature should The Pulsator 205 be stopped?

You can turn The Pulsator 205 off once all the ice is gone, especially if the day is cloudy or you notice a light breeze in the morning. An added benefit with this system is that there are no problems with waterlogging, soil over-saturation, or branch tears/breaks due to application.

FOR MORE INFORMATION

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