

HOT WATER TREATMENT

by

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Hot Water Treatment of dormant canes or plants aims at phytoplasma elimination without any alteration in their vegetative development capacity. In addition the treatment demonstrates a positive effect of sanitation against several bacterial diseases, pests and insects (including eggs) which may be present on woody material.

The treatment consists in the immersion of plant material **in agitated water at 50°C during 45 minutes**. In order to insure the efficiency of treatment and the preservation of material , 3 sets of conditions are required and must be followed carefully .

1 – Quality of vegetal material :

Canes and plants to be treated have to :

- contain the best possible amount of reserves, i.e. : a total lignification of material, grafts and cuttings originating from non-overloaded mother-vines, plants having completed their vegetative cycle at the moment of uprooting
- be kept at best conditions of temperature and hygrometry after cutting or uprooting, with a special attention to possible desiccation or loss of reserves due to excessive high outdoor temperatures. Storage in refrigerating chambers below 5°C with high hygrometry is strongly recommended.

Any vegetal material, with an insufficient reserves level or not looking fresh enough, might be altered by the Hot Water Treatment.

2 - An adapted and reliable treatment device :

To satisfy the expected physical and technical requirements, the equipment device has to fulfil precise fabrication standards regarding heating capacity, thermal isolation of the soaking recipient, constant maintenance of the exact temperature and homogeneity inside the material trough an efficient system for permanent mixing.

A prototype device has been developed at ENTAV, a patent was registered in France and this equipment is produced, according to the defined standards, by RCES – Mr Boutarin, (26 avenue du Meyrol, Z.A. du Meyrol, 26200 Montélimar, France, Tel/Fax 0033 4 75 46 03 41).

3 – Respect of the order of procedures :

Soaking induces a thermal shock susceptible of modifying the physiological state of the plant material (breaking of bud dormancy, inducing storage losses). In order to prevent a decrease of the grafting success rate and/or poor vegetative development, the following order of operations and some further recommendations should be carefully observed:

3.1 – Moment of the Hot Water Treatment in the scheme of plant production :

The hot water treatment should be done immediately before grafting, at the end of the storage period.

A treatment before or during storage in the refrigerating chamber is strongly inadvisable.

After treatment, a long storage might cause not only superficial mould and also a delay in the vegetative revival.

3.2 – Preparation of the material prior to the Hot Water Treatment :

The plant material should be thermally prepared to the treatment by storage for 12 to 24 hours at room temperature in a humid and aerated chamber.

The roots should be washed prior to the treatment. Cuttings should not be pruned or treated just before Hot Water Treatment.

3.3 - Precautions during the Hot Water Treatment :

The temperature (**50°C**) after immersion and the treatment duration (**45 minutes**) should be respected.

No fungicide should be added to the soaking water.

The water has to be changed regularly (every day).

3.4 - Precautions after the Hot Water Treatment :

After treatment, the plant material should be left to set back to room temperature (avoid direct contact with cold water) during 12 to 24 hours in a humid and aerated atmosphere before storage in a cold chamber for a short time, or before grafting.

3.5 - Precautions during transport :

The treated material needs to be placed for transport in aerated containers with water supply (providing a good hydration). If the external temperature rises (risks of fermentation or desiccation) it may be necessary to place containers in a refrigerated compartment during transport.

A non-respect of the order of procedures and precautions could lead to an important loss of plant material, even when the treatment as such was conducted as indicated.

These advises might be subjected to changes and improvement along with additional results on new experiments.

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