

Summary sheet

DEVELOPMENT OF MEANS TO CONTROL THE OVERPRODUCTION OF CONES IN ORNAMENTAL CROPS FROM *THUJA OCCIDENTALIS*

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HIGHLIGHTS

Among all the problems encountered in the production of Arborvitae, the overproduction of cones remains the one that cause the most losses. A project has been set up to identify an effective method to prevent the development of cones. The first year, the following products have been applied at the beginning and the end of the flowering of Arborvitae around April 17th and April 25th : naphthaleneacetic acid (NAA-Fruitone), carbaryl xlr (Sevin), ethephon (Ethrel), lime sulfur (calcium polysulfide), ammonium thiosulphate (20-0-0-26S), mineral oil (Sunspray 8%), kaolin (Surround WP), surfactant (Agral) and water. NAA, carbaryl and ethephon have been applied a third time around May 13th at fruit setting stage. All the tested products, have significantly reduced the numbers of cones produced compared to the control at both of test sites, excepted for kaolin and water. Significant reductions differences from the control ranged from 52% to 100%. The second year, 4 products have been selected to determine the optimal periods applications and frequency: ethephon, lime, oil and surfactant. Like the first year, ethephon and lime sulfur gave the best results. The efficiency of the lime, the surfactant and the oil were better when applied at the beginning of the flowering. Ethephon has been even efficient when applied at the beginning or at the end of the flowering. Therefore, no significant effect has been observed at fruit setting. LeafShield was apply 3 times during the second year. It was more efficient than the oil and the surfactant, but less than lime and ethephon. All products were less efficient in the second year. The reductions for treatments with 2 or 3 applications range from 9 to 89% compared to control.

OBJECTIVES AND METHODS

This project aimed to develop an effective method to prevent the formation and development of cones on cedar (*Thuja occidentalis*). In 2014 and 2015, trials of products known as chemical thinners were conduct simultaneously at two sites. The following products were applied at the beginning and at the end of flowering (mid-late April): 1-naphthalene acetic acid (NAA-Fruitone), carbaryl xlr (Sevin), ethephon (Ethrel), lime sulfur (calcium polysulphide) ammonium thiosulfate (20-0-0-26S), mineral oil (Sunspray 8%), kaolin (Surround WP), surfactant (Agral), LeafShield (wax emulsion) and water.

SIGNIFICANT RESULTS FOR THE INDUSTRY

The first year of trials allowed to identify eight products or combinations of efficient products to reduce the % of fertilized cones.

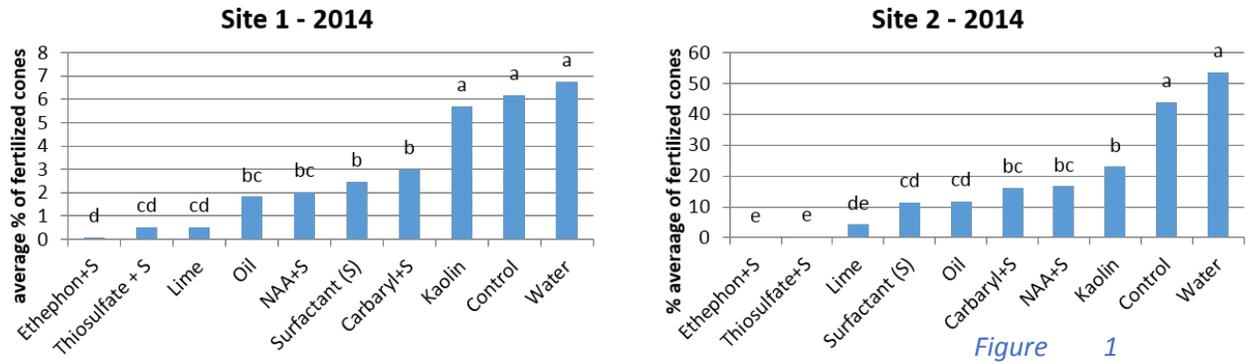


Figure 1 Average percentage of fertilized cones on site 1 and site 2 in 2014

For the second year of trials, 4 products were retained: ethephon, sulfur lime, dormant oil and surfactant. Thiosulfate was not retained because the product has burned the cones and the foliage the first year. The tested products have different modes of action (pollenid, physical barrier, burn, growth regulator). So, the flowering stage and timing of application could influence their effectiveness. This is why the 1st year, a closely follow up monitoring of the female cedar flowers development allows us to determine the best period of applications, the products have been applied 2 or 3 times to increase chances of identifying effective products. The second year has enabled to identify the optimal moments to use the products. (Figure 2)

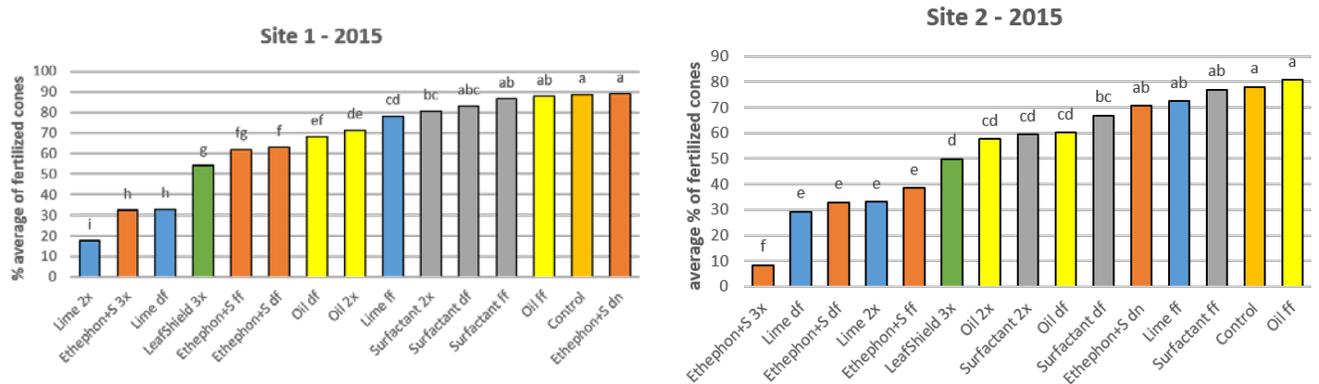


Figure 2 Percentage of fertilized cones on site 1 and site 2 in 2015

The results show that the lime was more efficient when applied at the beginning of the female flower flowering. On site 1, the second application, at the end of the flowering result in an additional decreasing of the fertilized cones percentage, but not on site 2. The ethephon show bests results when it is was apply 3 times. Nevertheless, the application at the beginning of fruit set did not significantly decreased the % of fertilized cones compared to the control one. While early and late flowering applications have been a comparable positive effect. This results suggests that 2 applications of ethephon during flowering would have an additive effect. Statistical analyzis did not show clear significant effects of the ethephon on plant growth, but plants tended to be weaker.

For oil, the results showed that it was more effective when applied at the beginning of the flowering. At both sites, the application at the end of flowering did not lead to a significant decrease additional % of fertilized cones.

The surfactant showed overall low efficiency in the 2nd year. Just like oil, it has been most effective when applied at the beginning of flowering.

LeafShield applied 3 times was significantly more effective than the treatments of oil and the surfactant at site 1, but not at site 2. This treatment was significantly less effective than 3 ethephon applications and 2 lime applications at both sites. The plants of this treatment were significantly shorter than the control plants, but not significantly different from most other treatments.

POSSIBLE APPLICATIONS FOR THE INDUSTRY

The project has identified 5 products that significantly reduce the number of fertilized cones on thuyas. The possibilities are therefore significant for nursery growers. For 4 of the 5 products, the optimal period of application has been identified. Before this project, there was no known techniques for reducing seed production in the thuyas production. Growers are now better equipped to face off this problem and reduce the losses it causes.

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