



Second-generation fiber products using sludges and fly ash

JAMK University of Applied Sciences performed studies where sludges and fly ash were used to protect the conifer plants.

The scope of this study was to find new products for forest industry based sludges and fly ash. Different laboratory hand sheets were prepared with different basic weights and composition to find stable form. Also, the nursery pots with different kind of nozzle technique were also prepared and tested.



Left: Fiber suspension with ash.



Right: Laboratory hand made sheet from fiber waste sludge (45 m-%) and fly ash (55 m-%).

Alternative plant protection product against large pine weevil

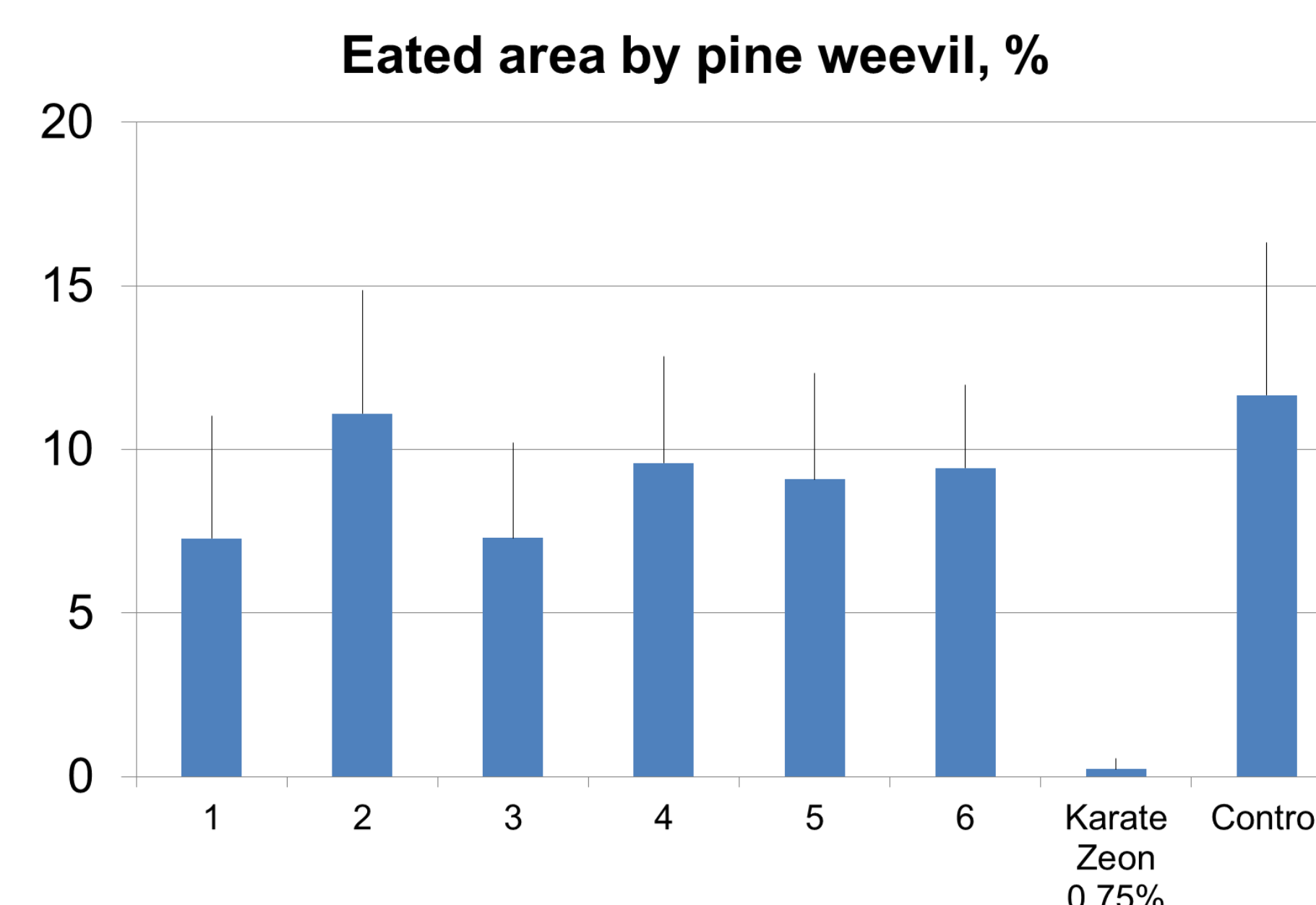
Large pine weevil (*Hylobius abietis*) damages one- and two-year-old conifer plants after planting by eating the bark. Meanwhile the usage of insecticides will be restricted by FSC forest certification. Therefore the prevention of conifer damages caused by the large pine weevil will be significant for ensuring the biomass production of cultivated Finnish forests.



Left: Treated conifer plants
Up: Large pine weevil eating bark

Fiber suspension used in this study act as binding component and fly ash as active protective component. Conifer plants were dipped on prepared suspension in the experiments.

The protection efficiency of the suspension was tested by the feeding test with large pine weevil in Natural Resources Institute Finland (Luke). Spruce shoots were treated with six different mixtures, one standard chemical treatment and one untreated sample (control). The pine weevil fed almost 12 % of the bark area from untreated conifer sample. Treated plants with the suspension were fed less.



Further research possibilities

More research is required for finding an effective and ecological plant protection method. New, enhanced plant coverages using ashes with different kind of sand particle sizes must be considered. Essential quality requirements of the product are the efficiency of spreading properties and the stability of the coverage with the weather conditions.

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