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The aim was to gain practical knowledge on injecting devices and report on the functioning, speed and suitability of two different injecting systems, especially to Finnish seed producers. The objective was reached and our experience and knowledge of the different injecting device were reported in Finnish *Taimiuutiset* –magazine [Seedling News] 3/2013 for the Finnish seed producers (attached paper copy).

After midsummer I joined my Swedish colleague Olle Rosenberg (Skogforsk, Uppsala) to help him carry out an injection experiment against cone and seed insects in Norway spruce seed orchard. We tested two different injector systems: WedgleDirect Inject from ArborSystems and TREE I.V. from Arborjet while carrying out the experiment.

Our experience was that Wedgle Direct-Inject is faster than Arborjet TREE I.V.. With the former injection tip is hammered in with a special tip setter to the stem so that the valve stays outside but is tightly enough attach to the bark to prevent leaking from the sides of the tip. Different lengths of needles or tips are available. We used 1.5 inch PortleTips. The needle is closed at the tip, but along the side it is full of small holes that deliver the insecticide to the xylem. The injection device is itself then attached to the needle on the tree and the handles are slowly pressed to release 1 ml (or 0.5 ml if adjusted) of insecticide to the xylem. One can repeat this and inject 2 ml per hole. Or more if the take up rate is fast enough. With conifers resin fast blocks the injection route. This looks to be a very neat operation on video but you need up to three people to be really effective and be able to inject many trees/grafts per day. The number of injection points depends on the tree/graft diameter.

In the ArborJet TREE I.V. system the insecticide is placed into a bottle (volume about 600 ml that is pressurized with a manual pump (style “bicycle”). In order to get the right volume of insecticide to each graft, one needs to measure the volume for every tree separately. A hose that branches into four is attached to the bottle. The hose is for four injection tips with valves. A drill is needed to drill a hole to the stem and then special plastic plugs (Arborplugs) are pressed to the hole with a special screw driver like tool. The tips are then pressed through the plugs and valves are opened to allow the flow of e.g. insecticide from the bottle to the tree. The take up of insecticide lasts several minutes, some 15 and it makes sense to have several sets started for a nearby grafts.

In addition we tried Quickjet from Arborjet with water, and it seemed quite promising compared to Tree I.V. system, in that you do not need to measure liquid for every bottle. After the experience in Sweden I conducted an injecting experiment in Finland successfully using Wedgle Direct-Inject. Now we wait for the cone crop of 2014 to gain results on the efficiency of our insecticide treatments from these experiments carried out both in Sweden and in Finland.

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