

Equipment for weed control in vineyards

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Herbicides, although relatively inexpensive, require good application techniques if improved deposition and drift reduction is to occur. Some of the commonly used herbicides damage vines and so great care must be taken. Drift has been a major concern for some years, off target application wastes money, reduces deposition on the target plant, damages vines, can lead to pesticide residue on grapes, pollutes water courses and may cause nausea to other people.

Boom Applicators

Two main types of boom applicator are available. A frame can straddle over the top of the canopy, spraying under the vine each side of the target row, or a boom maybe fitted to the front of the tractor spraying one side only of the adjacent rows. 20 -30 gallons per acre are typical spray volumes.

In all cases the use of hoods and break-back devices are important. A hood will protect the vines from drift created by the small droplets being emitted from the conventional flat fan nozzle. A simple hood can be made from a used plastic drum cut in half or a simple plastic tarp. A break-back device will protect the sprayer boom and nozzle from damage caused by inadvertently striking a trellis post etc. Break-back devices normally comprise a spring-loaded arm.

Correct nozzle selection is one of the most important yet inexpensive aspects of pesticide application. A nozzle's droplet size spectrum determines deposition and drift and is referred to as spray quality. Modern nozzle catalogues provide information on spray quality for each nozzle, when applying herbicides we need to select a MEDIUM quality spray. Conventional flat fan nozzles produce droplets in the range of 10 – 450 microns. There are 25,000 microns in one inch. Drift is a major problem with droplets less than 100 microns.

Increasing the Volume Median Diameter (VMD) will certainly reduce drift, but too large a droplet (>300microns) will bounce off the leaves to the ground, thus causing pollution, wasting money and resulting in less product on the target.

Conventional flat fan nozzles

Nozzles with 80⁰ degree angle produce coarser droplets than 110⁰ at the same flow rate but 80⁰ nozzles require the boom to be set at 17-19 inches whereas 110⁰ nozzles can be set lower at 15-18 inches above the target. (The lower the boom, the less chance of drift). Spray quality is fine – medium at 15- 60 psi

Pre-orifice flat fan nozzles

The internal design of this nozzle reduces the internal operating pressure compared to a conventional flat fan resulting in coarser droplets (high pressure creates fine droplets, low pressure creates coarser droplets). Available as 80⁰ or 110⁰ nozzles. Spray quality is medium - coarse at 30- 60 psi. Drift-guard is a well-known trade name.

Turbo-teejet

A turbulence chamber produces a wide angle flat spray pattern of 150°. Spray quality is medium – coarse at 15- 90 psi. Nozzles can be set at 15-18 inches above the target.

Air induction nozzles

Air induction, air inclusion or venturi nozzles are flat fan nozzles where an internal venturi creates negative pressure inside the nozzle body. Air is drawn into the nozzle through two holes in the nozzle side, mixing with the spray liquid. The emitted spray contains large droplets filled with air bubbles (similar to a candy malt ball) and virtually no fine, drift-prone droplets. The droplets explode on impact with leaves and produce similar coverage to conventional, finer sprays.

Air induction nozzles reduce drift even at higher pressures of 80-90 psi. They are available at 110° fan angles so boom height may need to be adjusted to 15-18 inches. The use of adjuvants will certainly help create bubbles. Air induction nozzles work very well for herbicide application, trials with paraquat in vineyards in the Finger Lakes have shown good deposition with no drift.

Boom manufacturers/distributors include:

The Green Hoe Co. Inc

OESCO, Inc.

Nozzle manufacturers include:

Albuz, Greenleaf, Hardi, Lechler, Tee Jet,

Sensor-Controlled Applicators

Sensor-controlled pesticide applicators use optical sensors to determine where weeds are located. These sensors, coupled with a computer controller, regulate the spray nozzles and apply herbicides only when needed, thus considerably reducing herbicide use. A computer-controlled sensor detects chlorophyll in plants and then sends a signal to the appropriate spray nozzle, applying the herbicide directly to the weed. The operator calibrates the system to bare soil or pavement, allowing the computer to determine when there is a weed present. Sensor-controlled applicators are often mounted on ATVs, John Deere Gators etc., they can also be attached to tractors or trucks. Typically, this type of applicator can be used at speeds up to 10 mph. A complete sensor-controlled system consists of a chemical tank, pump, battery power, computer controller, optical sensors and spray nozzles.

Benefits of sensor-controlled applicators -

- Reduced amount of herbicide applied
- Reduced potential for groundwater contamination
- Ability to apply herbicides in dark or light conditions
- If equipped with wind-deflecting shields, can reduce herbicide drift

Manufacturers/distributors include:

Patchen/NTech

OESCO

Zahm and Matson

Controlled Droplet Applicators (CDA)

Traditional flat fan nozzles produce a range of droplets, 10 -450 microns, some drift, some roll off the leaves others will adhere to the target leaves. A CDA herbicide applicator comprises an electrically-driven spinning disc under a large plastic hood or dome. The circumference of the disc has small teeth which break up the liquid herbicide into droplets, of which 95% are the same size. The speed of the spinning disc dictates droplet size. As there are no large or small droplets in the CDA spectrum, all the droplets stick to the plant and so reduced rates can be applied, e.g 1-8 GPA

Various widths of hood or dome can be selected, and are fitted with break-back devices. Where the ground is rough, e.g stones, then a bristle skirt maybe used. In young vines an optional plastic cover can be fitted over the bristle skirt.

CDA sprayers reduce the amount of water required, thus considerably improving spraying logistics. They are lightweight, relatively inexpensive and very manoeuvrable.

Distributors include;

Bdi Machinery Sales, NorthEastern Equipment, Lakeview Harvesters, Rammelt & Co.

Flame Applicators

Flame applicators simply use a flame to destroy weeds. Most flame applicators burn liquid propane gas to create a flame having a temperature near 2000°F. The flame is applied directly to the weeds using a hand-held wand or with boom-mounted torches attached to a tractor or ATV. The flame is applied to the weed for only a short period of time, usually about 1/10 of a second. The length of time the flame is applied depends on the age, size and tenderness of the weed. It is recommended that the flame be applied to weeds when they are 1 to 3 inches tall and typically in the spring and early summer. When the weeds are exposed to the flame, the water inside the plant cells boil, causing them to burst. (The weeds are not burned up.) By destroying the plant cells, the plant is unable to transport water and continue photosynthesis, causing the weed to wilt and die. Flame applicators should only be used when there is little or no potential for setting fire to dry plant material. Beware of setting fire to trellis posts and poison ivy.

Benefits of Flame Applicators -

- Non-chemical weed control method
- No harmful drift
- No groundwater contamination
- No chemical exposure to workers

Manufacturer:

Red Dragon

Where to look/buy

Albuz nozzles:

651-766-6300

<http://www.hypropumps.com/>

BDi Machinery Sales, Macungie, PA

1-800-808-0454

Bdi@fast.net

Green Hoe Company Inc

716-792-9433

<http://www.greenhoecompany.com/>

GreenLeaf nozzles

<http://www.turbodrop.com/>

1-800-881-4832

Hardi nozzles

563-386-1730

www.hardi-us.com

Lakeview Harvesters, Ont. Ca

1-866-677-4717

www.gregoireharvesters.com

Lechler nozzles

630-377-6611

<http://www.lechler.com/seiten/en/lechler.html>

Patchen Weedseeker:

1-888-728-2436

<http://www.ntechindustries.com/>

NorthEastern Equipment

1- 631 - 765 -3865

OESCO Inc., Conway, Ma

1 -800 -634-5557

www.oescoinc.com

Rammelt & Sons

1-800-388-3802

Red Dragon Flame

1-800-255-2469

<http://www.flameeng.com/>

Rittenhouse, Ont. Ca
1-800-461-1041
www.rittenhouse.ca

Tee Jet nozzles
<http://www.teejet.com/ms/teejet/>
Phone # 717-432-7222

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