

TECHNICAL NEWSLETTER

Invernada Technical Department // September 2019



ACHIEVING A SUSTAINABLE USE OF PESTICIDES

This Newsletter is intended as a guide to help producers to eliminate inefficiencies due to improper pesticide application.

Studies show that pesticide lost due to improper applications may exceed 57%; only 43% of the pesticide arrives at its intended destination; and the rest is lost. According to estimations, out of these losses 38% is lost by drift and 19% remains on the ground.

Besides, sometimes up to 100% of active ingredient may be lost due to a bad mixture, or some pesticides may be chemically incompatible.

The most common errors are listed below:

ERROR 1

Nozzles are not replaced between seasons

Before starting the season, the first recommendation is to **replace the complete nozzle kit** for new nozzles. Sometimes wear is not visible to the naked eye, but it does exist, and mis-calibration may be significant.

ERROR 2

Compatibility among pesticides is not checked

Often two or more pesticides are mixed together. However, the **pesticides must be compatible**. The label or safety sheet often lists compatibilities of the pesticide involved. Incompatible pesticides have a chemical reaction between them.

ERROR 3

Applying pesticides without knowing pest cycles

Knowing life cycles of the different pests affecting walnuts is important for monitoring them and ultimately deciding **when and what pesticide is to be applied**. This is a simple procedure that can be made with a magnifying glass.

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ERROR 4

Poor choice of water volume to be applied per hectare

In this stage, **checking pesticide accuracy and effectiveness with indicators** is crucial. To those ends, water sensitive paper or photolabile paints (Hi-Light®) are used.

If an excessive water volume is applied, pesticide would settle on the ground due to dripping. If pesticides are applied in wintertime, water volume would not exceed 1,500 liters per hectare in adult walnut orchards.

If pesticides are applied on foliage, water volume would not exceed 2,500 liters per hectare in adult walnut orchards.

ERROR 5

Applying pesticides when weather conditions are inappropriate

When **temperature is over 25 °C, pesticide application must be stopped**, since droplets evaporate before the pesticide can reach walnut leaves, and if it does, pesticide evaporates before penetrating them.

Application must be stopped if wind speed is over 6.5 km/h in order to prevent excessive drifts.

// WATER DROPLET DURATION AND FALL TIME

T°	20°C		30°C	
HR	80%		50%	
Droplet size	Duration (sec)	Maximum distance (m)	Duration (sec)	Maximum distance (m)
50 um	14	0,5	4	0,15
100 um	57	8,5	16	2,4
150 um	227	136,4	65	39



ERROR 6

Misdirected nozzles

Nozzle adjustments must be made when **changing pesticides or when walnut orchard age varies**. Such adjustments involve redirecting nozzles to apply pesticide only where needed, minimizing drifts and product loss due to the wrong application on the ground or where not needed.

ERROR 7

Not checking droplet size and calibrating equipment by pressure

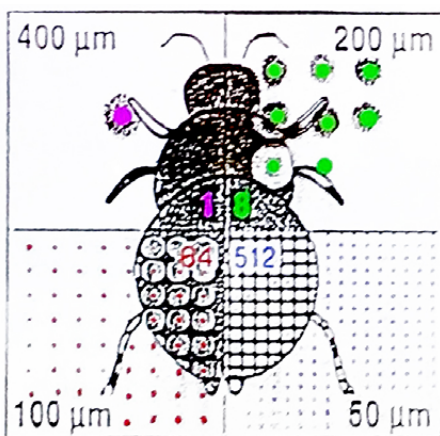
Sprayer adjustment is usually made by calibrating pump working pressure and tractor forward speed, notwithstanding droplet size.

See table provided by nozzle supplier for recommended droplet sizes. Based

on this data, working pressure, volume of water to be applied and speed are to be defined.

Remember: "The higher the pressure, the higher the flow, the smaller the droplet size, the smaller the reach."

Droplet size vs. coverage



// RECOMMENDED DROPLET SIZE PER PRODUCT

Product	Droplets/cm ²	Droplet diameter (microns)
Pre-emergency herbicide	20-30	400-600
Post-emergency herbicide	30-40	200-400
Insecticide	20-30	200-350
Fungicide	50-70	150-250
Acaricide	>70	150-250

- » The smaller the droplet size, the more the coverage.
- » The smaller the droplet size, the more the spray drift.



ERROR 8

Not controlling application speed

Pesticides are often applied at speeds exceeding 5 km/h, resulting in less penetration. Such speeds work for foliar fertilizers, but are inefficient in products without systemic characteristics or with a poor translaminar or "local systemic" activity.

An application speed between 4 and 5 km/h is ideal for better penetration. Turbo needs time to move air and penetrate the foliage.

ERROR 9

Bad choice of nozzle type

Recommended options are as follows:

- Single fan or double fan nozzles are recommended for **herbicides**.
- Hollow cone nozzles generally penetrate foliage well, and improve wrapping. They are used to apply foliar **pesticides, insecticides and fungicides**.
- Solid cone nozzles are also used to apply pesticides on foliage, but they generate more pesticide drip losses than hollow cone ones. They are used as a shock therapy. Used for applying **acaricides**.

ERROR 10

Not cleaning the sprayer tank thoroughly

After pesticide application is done, sometimes washing off the sprayer tank the three recommended times is overlooked.

Due to time constraints, sometimes equipment is not emptied after applying several doses of the same product. This results in product build-up and dosage increase.



ERROR 11

Not following mixing order of pesticides

A common procedure is mixing a variety of compatible products per application, but to be efficient this must follow a proper mixing order.

// MIXING ORDER OF PESTICIDES

1	Fill the tank with water to 3/4 capacity and begin stirring.
2	Add correctors as pH regulators.
3	Add water soluble bags.
4	Add wettable powders (WP); these must be pre-mixed before pouring them into the tank These are suspended in water. e.g. Hurricane; Imidan; Sanmite; Polaris; this formulation contains copper.
5	Add water-disperse granulates (WG). e.g. Lorsban 75; Avaunt; they remain diluted; this formulation contains copper.
6	Add soluble granulates (SG), insecticides such as Mospilan.
7	Add oil dispersions (OD).
8	Add spray concentrates (SC). e.g. Pyrinex; Calypso; Coragen, Cuprodul. This formulation contains copper.
9	Add capsule suspensions (CS).
10	Add emulsions, oil in water (EW).
11	Add emulsifiable concentrates (EC). Rimón, Admiral, Comet, Cormoran.
12	Add soluble concentrates (SL), algae extracts.
13	Add oils/surfactants e.g. Brek; Dash
14	Add foliar micronutrients/fertilizers. e.g. Basfoliar Zn, Defender Mg.
15	Microorganisms are added separately.
16	Fill with water and complete stirring until the end.

ERROR 12

Not checking pH levels in a solution

To measure pH levels in a solution, use test strips or a digital pH meter.

pH 6 is recommended for most pesticides.

pH 4 is recommended for glyphosates.

pH 5-6 are recommended for copper. At a pH below 5, metallic copper is released and may become phytotoxic to crops. At a pH over 6, copper is decanted by reacting to water carbonates, and a high percentage of metallic copper is retained.

Do not mix copper with acid pH chemicals, such as potassium phosphite, foliar nitrogen or amino acids (see safety sheet for compatibility).

Phosphoric acid is mostly used to lower the pH in a solution. But bear in mind that this effect lasts three hours only. Use specific chemicals for correcting pH levels.

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PLEASE REMEMBER:

- Do not pre-mix CEs.
- Do not mix micro-capsule suspensions with CEs or mineral oils.
- Always pre-mix WPs.
- Always shake SCs before use.
- Apply pesticides soon after mixing in order to avoid hydrolysis.

// IF YOU HAVE ANY QUESTIONS, PLEASE CONTACT
INVERNADA'S TECHNICAL TEAM

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