

Florel-Ethrel Application

Florel Quick Notes

- ✓ Drop pH of spray tank to <4.0 before adding Florel
- ✓ Use funnel to inject Florel into spray tank
- ✓ Allow >1-hour dry time to maximize uptake



Florel (Florel) is a highly effective plant growth regulator (PGR) that promotes flower bud abortion, enhances lateral shoot development and inhibits stem elongation. The challenge for growers who use Florel is consistent response when applying this chemical. Florel is very different from other chemicals applied in greenhouses and therefore requires specific mixing techniques and application methods to insure consistent results.

- ✓ Florel's active ingredient is ethephon gas which causes an ethylene response in plants when applied to the target tissue. The ethylene response causes flower bud abortion in sensitive buds. In many species the flower abortion triggers an increase in lateral shoot growth (branching).
- ✓ Florel is most effective at promoting branching on plants where the flowers are borne in the axil of the leaf (petunia, lantana, impatiens). In several composite flowers (chrysanthemum) it is effective at delaying development of the terminal flower which increases lateral branching. In other terminal flowering plants Florel does not promote branching but causes flower abortion. Trials are needed to determine the optimum response.
- ✓ Flower buds are sensitive to Florel induced abortion only during specific stages of development. Once the petals start expanding (showing color) excessively high Florel rates are needed to promote flower abortion. The optimum bud size is when the flower is still tight and green. Therefore, to keep flower buds aborted, frequent (weekly) application of Florel is needed to ensure that Florel is applied when the buds are responsive. Each species has a unique spraying frequency for maximum response, i.e. impatiens requires weekly sprays while zonal geraniums require bi-weekly and ivy geraniums require weekly treatment.
- ✓ The Florel response is quite rapid. When the optimum rate is applied, flower buds will abort and fall off the peduncle within 48 hours. To determine if you have applied sufficient active ingredients, check the plants within 48 hours by slightly tapping the flower buds which should fall off the peduncle.
- ✓ Excessive application rates will cause very rapid flower bud abortion, twisting and distortion of the growing point and leaf drooping that appears to be wilting. The difference is that the plants are not flaccid.
- ✓ The Florel response persists for different durations depending on species. Trials are needed to determine the optimum time for re-blooming after application. For example, impatiens will begin flowering within 14 days after application while geraniums require 6-8 weeks.
- ✓ When Florel is applied, the release of ethylene into the tissue causes a stress response in the tissue. If the plant is under any type of stress (water, temperature, light or nutrient) at the time of application, the Florel response is increased. This translates into increased response to Florel, even at the same Florel concentration, if plants are under stress at the time of application.

The problem most growers have with Florel is the inconsistency of response from application to application. There are several key factors that affect efficacy of the chemical.

- ✓ **Solution pH.** The Ethephon gas is held in solution at very low pH. The Florel concentrate pH is around 3. ***When mixing the spray solution, it is critical to first lower the pH of the spray solution to 3.5 to 4.0 before adding the Florel.*** Failure to lower the pH of the spray solution prior to mixing will cause a release of the Ethephon gas and therefore inconsistent amounts of Florel are in the spray solution. If you need to use rates higher than 500 ppm to achieve a good response, then the spray solution pH is too high. If you find using 100 ppm or less causes severe damage, then the solution pH is too low, and you may need to add some alkalinity to mitigate the response. This low pH is common when the water alkalinity (bicarbonate) is less than 20 mg/l (0.3 meq)

- ✓ **Mixing method.** Because the Ethephon gas is held in solution at a low pH it is critical that the Florel is injected into the spray solution when mixing and not poured in. *Use a funnel to inject the Florel into the bottom of the spray tank to prevent loss of the Ethephon gas from the spray tank.* This mixing method insures consistent amounts of Florel will be applied and therefore consistent response to the treatment.
- ✓ **Concentration.** The normal application rate for Florel is 75-500 ppm. The rate depends on what your treatment objective is.
 - ➔ **Initial flower bud abortion.** If you are making the first application to the plants, you will need to apply a higher concentration to abort flowers that are past the sensitive stage. It is not unusual to apply 250 – 500 ppm to achieve this effect. In geraniums this treatment is needed several times due to the umbel inflorescence.
 - ➔ **Flower bud maintenance.** Once the mature flower buds are aborted, rates of 75-200 ppm are normal when used on a regular (weekly) basis. The small immature flower buds are more responsive to low concentrations.
 - ➔ **Recalcitrant flowers.** There are some species that require a higher concentration to induce abortion or inhibition of flower development. Most composite flowers need a higher concentration to promote the response. It is not unusual to use 500 – 1000 ppm on some chrysanthemum varieties that are excessively floriferous or form crown buds.
- ✓ **Other issues.** If you find inconsistencies even after following the mixing procedures outlined above, have a complete water test performed on the solution. If there are excessively high levels of calcium, greater than 300 ppm (5 meq), the calcium can tie up the Florel and reduce the efficacy of the Florel. Anytime you need to consistently use rates above 500 ppm to obtain a response there is a water quality problem that needs to be adjusted to improve efficacy.
- ✓ **Spray Method.** The normal spraying pace for pesticides and other PGRs is too fast for applying Florel. We find that you need to apply two to three times the volume per plant to achieve consistent control with Florel. Using a cone nozzle rather than a fan will increase the thoroughness of the spray treatment. If you spray too fast, you do not get the spray coverage necessary to obtain the desired results. *Florel is not extensively translocated within the plant. The tissue that is coated with chemical is the tissue that responds to the application.* If you fail to thoroughly spray the flower buds, you will not see abortion within 48 hours.
 - ➔ Excess spray application at high concentrations can cause twisting of the leaves at the growing point. It is better to apply a larger volume at a lower concentration rather than spraying faster. Spraying too fast increases the variability of the response.
 - ➔ Spraying too little volume or failure to completely coat the flower buds results in uneven abortion. You will see uneven response – one side of the plant has no flowers other side contains buds etc.
 - ➔ If you find that you achieve good bud abortion at low rates but see excessive stunting or leaf twisting, try using a ‘spray and wash’ strategy. This strategy requires you to spray at a higher rate than normal and then wash the Florel off after 15-60 minutes. This method needs extensive trials to produce consistent results, but it is very effective on some crops.
- ✓ **Spraying Time.** We like to spray so that we have a long drying time to increase the slow uptake of the Florel by the tissue. Since the Florel is a gas that is held in solution, if the solution dries too fast then there is only a slight amount of the gas that moves into the tissue. We normally apply very early in the day when we know that the drying time is at least 60-90 minutes. This will guarantee maximum uptake of the Florel by the tissue.

Although the recommendations sound rather complex, once the procedures are established Florel is one of the easiest and most useful chemicals that you can use in the greenhouse. Make sure adequate trials are done to understand the optimum treatment methods.