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# 101 Ways to Try to Grow Arabidopsis: How Much Imidacloprid (Marathon 1G) Need Be Applied?

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## Purdue Methods:



## How much imidacloprid (Marathon 1G) need be applied?

### Short answer:

If needed, 0.25 teaspoon/3" pot (4.2 kg/m<sup>3</sup>), the lowest recommended rate

### Results:

We tested the dose response to this chemical on *Arabidopsis*, and also the effect of poor mixing, which would result in some pots being over-dosed. Our study showed visible reduction in vegetative growth and delayed flowering at all rates of Marathon 1G higher than the lowest recommended rate, and non-uniform vegetative growth of poorly mixed treatments at all rates. Some inconsequential leaf edge necrosis was photographed even on the lowest rate.

It is also interesting that plants with the lowest rate of Marathon 1G flowered several days earlier than control plant that were not treated. However, the treatments were randomized in the irrigation trays (to keep the product from leaching into untreated pots), so early flowering of one treatment could have resulted from watering or fertilizer variation. Further study may be warranted.

### Discussion:

Marathon 1G (1% active ingredient) is a granular formulation of the chemical imidacloprid, an effective control of the aphid species commonly observed in greenhouses. We do not recommend preventative applications of one chemical class in an environment with continuous cropping such as occurs in *Arabidopsis* growth areas, lest resistance develop to the chemical. In contrast, we spray a liquid formulation of this active ingredient (or other products) on infested plants at first sign of the aphids. Many institutions have mastered biological control of aphids and other insect pests. However, some researchers still use the granular chemical incorporated into the soil mix prior to planting.



**Figure 1. Representative plants from six treatments. Bottom row, from left: No Marathon, Marathon at 1x recommended rate; Marathon 2x. Top row, from left: Marathon 3x; Marathon 5x; and marathon at 10x recommended rate.**



**Figure 2. From left to right: No Marathon; Marathon 1x the recommended rate; Marathon 1x but poorly mixed; Marathon at 2x; Marathon 3x; Marathon 3x poorly mixed; Marathon 5x; Marathon 10x; Marathon 10 poorly mixed. Flowering has only occurred in Marathon 1x and 1x poorly mixed. Controls are not flowering yet in this image.**



**Figure 3. Marathon was applied at recommended rate (pre-plant incorporation) to these plants, but poor mixing was simulated, resulting in variable size and vigor between pots.**



**Figure 4. Close up of a plant that received Marathon at recommended rate. Some leaf margin necrosis was visible on these plants (as well as all Marathon treated plants) that did not appear on controls. It did not appear to cause problems with growth or flowering.**