RANUNCULUS PRODUCTION WITH METHYL BROMIDE ALTERNATIVES

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Ranunculus is grown in California for cut flowers and tubers. Methyl bromide is used to control soilborne pathogens, weeds, and residual tubers in the Ranunculus fields. Soil pathogens can reduce flower production and tuber harvest by 50%. Methyl bromide (MB) alternative fumigants that can be used for Ranunculus production are chloropicrin (Pic), 1,3-dichloropropene (1,3-D, InLine or Telone), iodomethane (IM, Midas™ is pending registration), and methyl isothiocyanate (MITC) generators such as metam sodium, metam potassium, and Basamid. Our early research evaluated the efficacy of high application rates of these fumigants using standard high density polyethylene mulch (HDPE) for Ranunculus flower and tuber production. The objectives of the current research was: 1) to evaluate the efficacy of reduced rates of alternative fumigants applied by drip fumigation in combination with metam potassium under virtually impermeable film (VIF) and semi-impermeable film (SIF), and 2) to evaluate the efficacy of MB/Pic and Midas (IM/Pic) applied by shank injection under VIF and HDPE.

Methods

Shank and drip fumigation experiments were conducted for two growing seasons on commercial Ranunculus fields in Carlsbad, CA. In the shank fumigation experiment, the plots were 11 feet wide and >125 feet long. Methyl bromide/Pic (67:33) at 350 lbs/A and iodomethane/Pic (Midas™ 50:50) at 300 lbs/A were shank-applied at >12 inches deep and immediately covered with VIF or HDPE tarp. In the drip fumigation experiment, InLine (300 lbs/A), Pic (200 lbs/A), Midas™ (200 lbs/A of 33:67 formulation), and MB/Pic (200 lbs/A) were applied through two drip lines to 30 inch-wide beds (>150 feet long) under clear VIF or SIF. Metam potassium (KPam, 30 gal/A) was applied one week later through the same drip irrigation systems. Tarps were left on the beds for another week and then cut and removed. Planting was done three weeks after metam application (late November 27).

Results

Our research on reduced rates of fumigants found that drip fumigation with Midas (33/67) at a rate of 200 lbs/ac, chloropicrin at 200 lbs/ac, or Inline at 300 lbs/ac produced greater Ranunculus bulb yields than drip-applied MB/Pic at 200 lbs/ac (Figure 1). The sequential drip application of metam potassium (KPam, 30 gal/ac) one week past soil fumigation with Midas, Pic, InLine, or MB/Pic significantly increased total yields and the control of weeds such as little mallow and clover. The sequential application also enhanced the control of *Fusarium* and

Pythium spp. Yields from the sequential treatments were equivalent to yields from commercial fields treated with standard MB/Pic.

Shank application of Midas (50/50) at a rate of 300 lbs/ac showed similar control of soilborne pathogens and weeds to MB/Pic at a rate of 350 lbs/ac. However, in all experiments, there was no significant benefit from using VIF relative to SIF or HDPE tarp.

This paper will summarize previous and current research results on MB alternatives for Ranunculus production in California. The effect of the alternative fumigant on bulb quality will also be discussed.

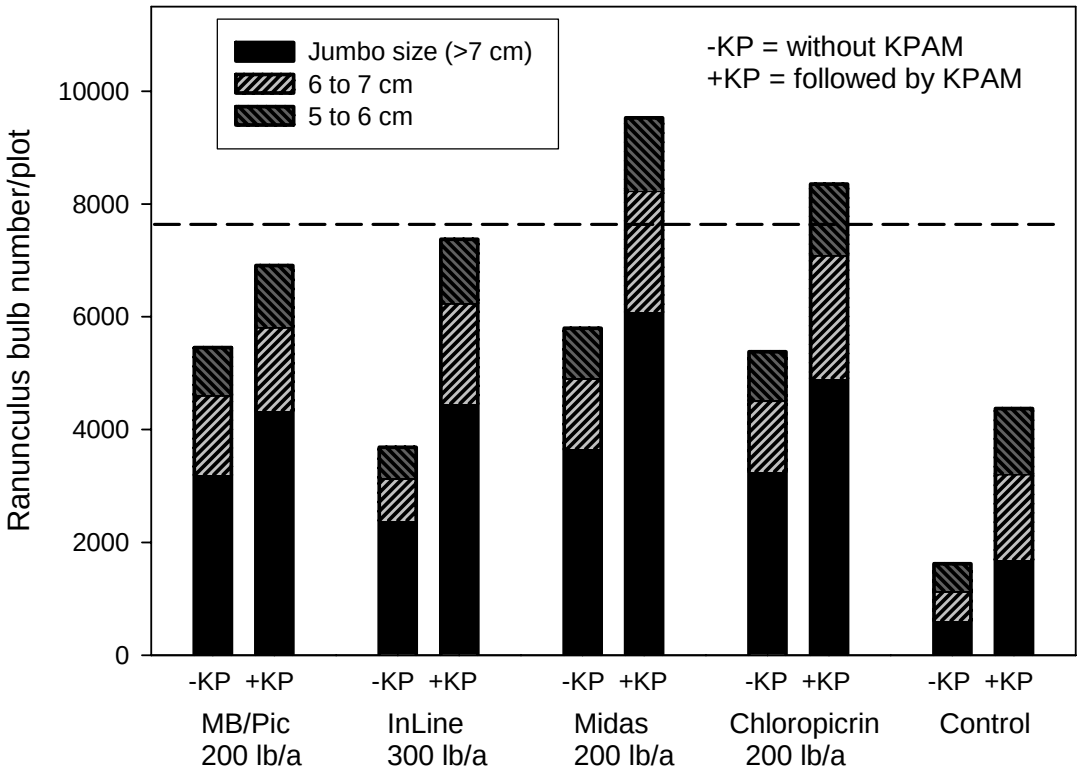

Figure 1. Summary of Ranunculus bulb yield by size class under various soil fumigants with and without 30 gal/ac of metam potassium (KPAM). The dashed line is average bulb number from the commercial field treated with MB/Pic.
* Jumbo and total bulb yields in the untreated control were significantly different ($P \leq 0.05$) from all chemical treatments.