

SYNOPSIS OF STRAWBERRY PLASTICULTURE RESEARCH WITH IODOMETHANE IN NORTH CAROLINA SINCE THE YEAR 2000

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At NC State University in the Department of Horticultural Science we have been investigating various iodomethane formulations in conjunction with Tomen-Agro, Arvesta, and now Arysta LifeSciences, since the year 2000. Studies in 2000-2001 and 2002-2002 were primarily focused on weed and disease control with iodomethane in high elevation strawberry runner plant nurseries in Western North Carolina. Also, beginning in 2001 we began evaluations of iodomethane in strawberry plasticulture fruit production, and this work has continued to the present time, with our most recent work with Midas 50:50 showing very good potential at broadcast rates of from 150 to 175 lbs./A in both 2006 and 2007. This paper will provide a synopsis of all our trials involving the use of iodomethane in the strawberry plasticulture system since 2000 at Central Crops Research Station in Clayton, NC (USDA hardiness Zone 7b, lat. 35°7' N, long. 78°5' E). The soil is a Norfolk sandy loam, and fumigation normally occurs in the second week of September with transplanting of plug plants in first or second week of October. Fertilization (N at 60 lb/A, P at 50 lb/A and K at 60 lb/A) is applied before fumigation in all plots. The experimental designs used have been randomized complete block designs with from four to six replications, and individual fumigated plots are typically 5ft x 80 ft in. Iodomethane is applied 8 inches deep using a fumigant applicator equipped with two shanks spaced 10 inches apart. The equipment simultaneously applies fumigant, forms the bed, applies the drip tape and plastic mulch covers. Irrigation in the fall season following transplanting is provided primarily by overhead sprinkler irrigation. Strawberry plugs of the cv. Chandler are transplanted in the middle 20' section of each 80' fumigated plot, and after transplanting all plots are trimmed in length to 25'. Each raised bed has two rows of plants, staggered 12" apart within each row (total of 40 plugs per plot). Row covers are used for freeze protection in winter whenever temperatures below - 9 °C are forecasted, and in the early spring overhead sprinkler irrigation is used for frost control of blossoms. In 7 years of investigation we have been fortunate not to lose more than 5% of the blossoms to frosts and freezes due to a proactive frost protection program that sometimes utilizes both sprinkling and row covers in the most severe cold events with sub-freezing temperatures and winds exceeding 10 mph. In the spring, plants are harvested two times each week from mid- April through the end of May (usually 12-14 harvests). Berries are field picked and graded (less than 10 g are considered culls, and also any misshapen fruit, or berries infected with gray mold were also considered culls). At each harvest, total weights, cull weights and marketable fruit weight was recorded and 25 berry weights are for calculation of average berry weight.

The paper will highlight results with iodomethane use from 2000-2001 through the 2006-2007 season. In the section below we provide a summary of results from the 2005-2006 season at Clayton, NC.

2005-2006. Total, marketable and cull yield were significantly greater for fumigated soil with Midas 50:50 compared with the control (Table 1). No statistical differences were detected for Midas 50:50 fumigation rates, but it was notable that the rate of 150 lb/acre produced the highest total and marketable yield in this trial. This information was also presented in an Orlando meeting in May 2006 when the EPA was reviewing Arysta LifeScience's request for an EUP. The 150 lb/acre broadcast rate would indicate that only 75 lb/acre of this product would be required for shank treatment in-the-bed in North Carolina, where a 5' row center is standard and the plastic mulch covered beds occupy 50% of an acre. The 100 lb/acre Midas 50:50 rate was not as satisfactory as the 150 lb rate/acre for either total or marketable yield. The control produced less than 50% of the total yield of fumigated plots.

Table 1. Yield of Chandler strawberry plants grown with different Midas 50:50 fumigant rates, Clayton Central Crops, 2005-2006

Midas 50:50 (broadcast rate)	Total yield (lb/acre)	Marketable yield (lb/acre)	Cull yield (lb/acre)	Crown number/plant
300 lb/acre	27,268 a	25,157 a	2,110 a	4.4 a
250 lb/acre	27,847 a	25,921 a	1,925 a	4.0 a
200 lb/acre	29,145 a	27,021 a	2,124 a	4.6 a
150 lb/acre	29,361 a	27,113 a	2,248 a	4.3 a
100 lb/acre	28,061 a	25,761 a	2,300 a	4.7 a
0 lb/acre (control)	13,939 b	12,832 b	1,106 b	2.4 b

In this study there did not appear to be any benefit associated with the use of metalized film covers compared to conventional polyethylene mulch films used in the North Carolina strawberry industry. However, it should be mentioned that we did encounter some problems in application of the metalized films due to their "slickness" and getting adequate tension in all directions was a definite problem with our application equipment.

In 2006-2007, we expanded our evaluations of plastic films to include Pliant Blockade (VIF), and also added methyl bromide:chloropicrin (67:33) treatments at 350 lb/A and 175 lb/A for comparison to Midas 50:50 at 125, 150 and 175 lb/A. The barrier film Pliant Blockade did appear to improve efficacy of MeBr:pic with 31,510 lb/A marketable fruit production vs. 28,051 with standard black LDPE at the 175 lb/A rate. However, we did not observe similar results with Midas 50:50 as the 175 lb/A rate with black LDPE plastic produced yields of 32,030 per acre (highest in study). In contrast, marketable yields were 29,927 lb/A with Pliant black VIF and Midas 50:50 at 175 lb/A. Portions of the 2005-2006 and 2006-2007 studies will be repeated in 2007-2008 to try to understand why Midas 50:50 at rates of from 150 to 175 lb/A broadcast has performed so well in North Carolina conditions without the added expense for barrier film.