Handling, storing and preparing fresh fruits and vegetables. Fruit and Vegetable Facts and Pointers. United Fresh Fruit and Vegetable Assn., Alexandria, Va.
13. Snedecor, G.W. 1950. Statistical methods. Iowa State College Press, Ames.
14. Technicon Industrial Systems. 1976. Riboflavin (vitamin B_2) in food products. Industrial Methods No. 140-71A. Technicon Industrial Systems, Inc., Tarrytown, N.Y.
15. Technicon Industrial Systems. 1976. Total vitamin C in food products. Industrial Method No. 365-75A. Technicon Industrial Systems, Inc., Tarrytown, N.Y.
16. Technicon Industrial Systems. 1977. Thiamin (vitamin B_1) in food products. Industrial Methods No. 479-77A. Technicon Industrial Systems, Inc., Tarrytown, N.Y.

HortScience 20(1): 73–74. 1985.

Effect of Triacontanol on Yield and Fruit Composition of Spring-harvested 'Tangi' and 'Dover' Strawberries

Osman bin Hashim[1] and C.A. Lundergan
Department of Horticulture, Louisiana State University, Baton Rouge, LA 70803

Additional index words. *Fragaria* x*ananassa*, compositional analysis, 1-hydroxytriacontane

Abstract. **Triacontanol (1-hydroxytriacontane) applied as a foliar spray or soil drench to 'Tangi' and 'Dover' strawberries (*Fragaria* xananassa Duch.) did not affect total yields when applied at 0.1 - 5.0 mg/liter. Fresh fruit weight was increased significantly when triacontanol was applied at 2.00 mg/liter. Soluble solids, pH, solids:acid ratio, titratable acidity, ascorbic acid content, and internal color of fruit were not affected by triacontanol.**

Triacontanol [$Ch_3(CH_2)_{28}CH_2OH$], a principal long chain alcohol derived from alfalfa hay (*Medicago sativa* L.), has many characteristics of a plant hormone (5). In some instances, exogenous applications of triacontanol have been shown to increase the growth and development and yield of several crop plants (4).

Mamat et al. (3) reported increases in yield and number of fruits in triacontanol-treated tabasco pepper (*Capsicum frutescens*). Bouwkamp and McArdle (2) found that applications of triacontanol on sweet potatoes (*Ipomoea batatas*) increased percentage of dry weight and percentage of N of the leaves, but had no measurable effect on root yields, root protein, or percentage of dry matter of the root. No effect on muskmelon (*Cucumis melo*) was reported (1).

Preliminary work indicated that triacontanol applied as a foliar spray at prebloom and postbloom was not effective in influencing the fruit production of 'Tangi' and 'Dover' strawberries.

The objective of this research was to evaluate the response to triacontanol applied as a soil drench and as a foliar spray by measuring strawberry production and fruit quality factors.

'Tangi' and 'Dover' strawberries were planted 8 Nov. 1982, in Olivier silt loam soil. Ten plants per plot were established in raised beds covered with 1.5 mil black polyethylene. Rows were 1.22 m apart and the plots were 1.52 m long with plants set 0.31 m apart in double rows.

Triacontanol was prepared according to the method developed by Mamat et al. (3) and was applied to the plants within 24 hr. The 1st application of triacontanol was made by pouring 25 ml of the solution over the roots at transplanting, using concentrations of 0, 1.00, 1.25, 1.50, 1.75, and 2.00 mg/liter. A 2nd treatment was made at first bloom as a foliar spray applied to the point of run-off, using the same 6 concentrations.

Twice weekly harvesting of fruit with 90% red color began on 7 Mar. 1983. All fruit were weighed and counted to determine yield per plot and average fruit size.

A randomized split-plot design was used in the field with cultivar as the main plots and triacontanol treatment within subplots.

Received for publication 30 Jan. 1984. The authors wish to thank Jackie Carlisi, Kenneth Koonce, and Ronald Mower for their assistance. The cost of publishing this paper was defrayed in part by the payment of page charges. Under postal regulations, this paper therefore must be hereby marked *advertisement* solely to indicate this fact.
[1]Present address: Farm Office, Universiti Pertanian Malaysia, Serdang, Selangor, Malaysia.

Table 1. Effect of triacontanol on yield of 'Tangi' and 'Dover' strawberries.

	Yield (MT/ha)			
Main effects	Early season 6–28 Mar.	Mid season 29 Mar.–29 Apr.	Late season 30 Apr.–16 May	Total season
Triacontanol (mg/liter)				
2.00	2.60	8.55	4.33	15.49
1.75	2.93	8.20	5.04	16.12
1.50	2.57	7.96	4.77	15.29
1.25	2.95	8.07	4.44	15.46
1.00	2.81	8.56	5.05	16.38
0.00	2.64	7.33	5.68	15.76
LSD	NS	NS	1.30	NS
Cultivar				
Tangi	1.86	4.61	7.99	14.49
Dover	3.63	11.61	1.78	17.01
LSD	1.28	2.28	2.39	2.53

NS, Not significant.

Table 2. Fruit size of 'Tangi' and 'Dover' strawberries following triacontanol treatment.

	Fruit size (g/fruit)			
Main effects	Early season 7–28 Mar.	Mid season 29 Mar.–4 Apr.	Late season 30 Apr.–15 May	Total season
Triacontanol (mg/liter)				
2.00	14.1	16.5	9.0	14.1
1.75	13.6	15.0	9.5	13.5
1.50	13.7	14.9	9.2	13.4
1.25	13.4	14.7	8.5	12.8
1.00	13.0	14.9	8.5	12.9
0.00	12.4	15.1	8.3	12.5
LSD	1.4	NS	NS	1.5
Cultivar				
Tangi	10.0	11.0	9.0	10.0
Dover	17.0	19.0	8.0	16.0
LSD	1.9	3.9	0.8	1.8

NS, Not significant.

Table 3. Effect of Triacontanol on fruit composition of 'Tangi' and 'Dover' strawberries.

Triacontanol (mg/liter)	pH	Soluble solids (%)	Titratable acidity (%)	Solids-acid ratio	Ascorbic acid (mg/100 g)	Color[z] L	a	b
2.00	3.43[y]	6.0	0.85	7.27	55.48	17.60	28.16	8.86
1.75	3.45	5.9	0.83	7.34	49.46	17.78	27.75	8.82
1.50	3.43	5.8	0.86	7.06	50.92	18.47	27.68	9.40
1.25	3.44	5.8	0.82	7.20	50.29	17.55	27.47	8.82
1.00	3.44	5.8	0.83	7.21	52.18	17.93	28.40	9.04
0.00	3.44	5.9	0.84	7.25	52.88	17.80	28.66	9.09

[y]ANOVA showed all factors analyzed exhibited no significant differences due to treatment.
[z]Hunter color values

A randomized complete block design was used for compositional analysis of the fruit. The data were analyzed using the analysis of variance. Where significance was observed, an LSD means separation test was done.

Exogenously applied triacontanol had no effect on the fruit yields in the early and mid season, but 2.00 mg/liter triacontanol decreased the late season yield by 24% compared to the control (Table 1). There was no significant interaction between triacontanol and cultivars.

Quantitative evaluation of fruit from triacontanol-treated plants revealed an improvement in the average fruit size in the early harvest season (Table 2). Fruit from plants treated with 2.00 mg/liter triacontanol were significantly larger than the fruit in the control plots.

Applications of triacontanol had no effect on the pH, soluble solids, titratable acidity, solids:acid ratio, ascorbic acid content, and color of the fruit (Table 3). Also, under this one season's conditions, triacontanol applications did not influence the internal color nor intensify the red pigmentation in the skin of the fruit.

Under the existing experimental conditions, triacontanol applications had no effect on yield, pH, soluble solids, titratable acidity, color, and ascorbic acid content of the field-ripened fruit. An early increase in fruit size from 2.00 mg/liter triacontanol was not large enough to justify the application of triacontanol commercially. Sensory evaluations (data unreported) revealed that triacontanol treatments did not affect the flavor of the fruit. No phytotoxic effects from either triacontanol or the control (oleic acid + Triton X) were observed throughout the experimental period.

Literature Cited

1. Bosland, J.M., D.L. Hughes, and M. Yamaguchi. 1979. Effects of glyphosine and triacontanol on growth, yield, and soluble solids content of 'PMR-45' muskmelons. HortScience 14(6):729–730.
2. Bouwkamp, J.C. and R.N. McArdle. 1980. Effects of triacontanol on sweet potatoes. HortScience 15(1):69.
3. Mamat, A.S.B, J.F. Fontenot, and D.W. Newsom. 1983. The effects of triacontanol on growth and development of Tabasco pepper. HortScience 18(2):247–249.
4. Ries, S.K., T.L. Richman, and V.F. Wert. 1978. Growth and yield of crops treated with triacontanol. J. Amer. Soc. Hort. Sci. 103(3):361–364.
5. Ries, S.K., V.F. Wert, C.C. Sweeley, and R.A. Leavitt. 1977. Triacontanol: A new naturally occurring plant growth regulator. Science 195:1339–1341.

HortScience 20(1): 74–76. 1985.

Yield Component Analysis of 'Benton' and OR-US 4356 Strawberries

Jeffery L. Olsen[1], Lloyd W. Martin[2], and Patrick J. Breen
Department of Horticulture, Oregon State University, Corvallis, OR 97331

Additional index words. achenes, trusses, barrenness, berry expansion, *Fragaria × ananassa*

Abstract. **In the 1st (1981) and 2nd (1982) fruiting years, 'Benton' strawberry (*Fragaria × ananassa* Duch.) formed 25% to 30% more crowns/plant than the advanced breeding selection OR-US 4356. 'Benton' had fewer trusses/crown than OR-US 4356 in 1981 (0.93 vs. 1.47) but both had 1.5 in 1982. OR-US 4356 had about 60% more fruit/truss in each season; however, 'Benton' had 75% greater mean berry weight than OR-US 4356, so that the 2 genotypes produced essentially the same yields/plant in each season, averaging 0.82 kg (1981) and 0.94 kg (1982). The genotypes did not differ in the total number of achenes/berry. Both showed a linear increase in berry weight with achenes/berry; yet OR-US 4356 had significantly lower berry weight than 'Benton' at equivalent achenes/berry. Increased berry expansion in 'Benton' was reflected by a reduction in number of achenes/cm^2 of berry surface. The values, averaged over both seasons, were 10.6 ('Benton') and 14.0 (OR-US 4356). OR-US 4356 failed to produce higher yields than 'Benton' because of limitation in fruit expansion.**

Yield component analysis can be used to evaluate strawberry genotypes by identifying strengths or weaknesses in the balance of their components. Yield per plant can be attributed to the multiplicative effects of 4 yield components: 1) the number of crowns/plant, 2) number of trusses (inflorescences)/crown, 3) number of berries/truss, and 4) mean berry weight (9, 14).

The degree of berry expansion also is a useful parameter in assessing yield potential. The number of achenes per unit area of berry surface can be used to quantify the extent of berry expansion (1). Low values represent increased berry enlargement. A value of 8 achenes/cm^2 may reflect the maximum berry expansion to be expected under field conditions (14).

A yield component analysis was undertaken in order to quantify yield characteristics of field grown strawberries in Oregon. 'Benton', Oregon's leading cultivar, and an advanced breeding selection, OR-US 4356, were chosen for study because of their apparent differences in growth and fruiting habits.

Planting occurred in mid-May of 1980, on a Willamette silt loam soil at the North Willamette Experiment Station. Plants were set 38 cm apart in rows with 1.0 m between rows. Fertilizer (10N–9P–8K, 336 kg/ha) was applied in June, after plant establishment, and again the following year during August renovation.

On 15 of June 1981 and 1982, near the start of fruit harvest, 25 random plants of each cultivar were harvested destructively to determine the numbers of crowns/plant, trusses/crown, and fruit/truss. Fruit also was harvested as it ripened during the season from

Received for publication 24 Apr. 1984. Oregon Agricultural Experiment Station Technical Paper No. 7124. From the MS Thesis of the senior author. The cost of publishing this paper was defrayed in part by the payment of page charges. Under postal regulations, this paper therefore must be hereby marked *advertisement* solely to indicate this fact.

[1]Present address: OSU Extension Service, 1134 SE Douglas, P.O. Box 1165, Roseburg, OR 97470.
[2]North Willamette Experiment Station, 15210 NE Miley Road, Aurora, OR 97002.