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by

James V. Davis	Research Associate, Soil Chemistry
D. R. (Ron) Earhart	Research Associate, Vegetables
Vincent A. Haby	Associate Professor, Soil Chemistry
Allen T. Leonard	Research Assistant, Soil Chemistry
Elizabeth W. Neuendorff	Research Associate, Fruits
Gary H. Nimr	Technician II, Fruits
Miguel A. Palacios	Graduate Student, Roses
Kim D. Patten	Assistant Professor, Fruits
H. Brent Pemberton	Associate Professor, Roses
Stanley C. Peters	Formerly, Technician I, Fruits
William E. Roberson	Technician I, Roses
Ruth A. Taber	Research Scientist, Plant Pathology, College Station
Glenn C. Wright	Graduate Student, Fruits

Texas A&M University Agricultural Research
and Extension Center at Overton

Texas Agricultural Experiment Station
Texas Agricultural Extension Service

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T-BUD GRAFTING SUCCESS AS A RESPONSE TO BUDDING DATE FOR FIELD PRODUCTION OF FOUR CULTIVARS OF ROSE

H. Brent Pemberton and William E. Roberson

INTRODUCTION

The T-bud graft procedure used for field production of rose plants can account for as much as 26% of the total cost. Losses of up to 50% are common. Many factors such as budding date, water stress, and method of budding coverage are thought to influence budding success. The effect of these factors is also assumed to be cultivar specific. The objective of this study was to evaluate the T-bud graft survival for four cultivars budded on three dates during the spring and summer of the first year of production.

MATERIALS AND METHODS

All buds except the top two were removed on eight inch cuttings of *Rosa multifora* prior to planting in raised beds 6 inches apart in 40 inch rows on 24 December 1985. The field was leveled in late April in preparation of applying the T-bud grafting treatments. Over 4 to 5 day periods, buds of the cultivars Mr. Lincoln, Peace, Tiffany, or Blaze were T-bud grafted to the rootstock plants beginning on 6 May 1986, 10 June 1986, or 7 July 1986. Rootstock tops were removed to force the scion buds on 1-3 April 1987. Plants were dug and assigned grades one, half, two, or cull according to Texas Department of Agriculture standards on 4 March 1988.

Cultivation was performed regularly during the two years of production when growth was active. Princep, Dual, Surflan, and Fusilade were used for weed control. Manzate and Dithane M were used as a preventative for fungal diseases. Approximately 1300 total lbs/ac 13-13-13 was applied in 3 split applications from April to June 1987. Supplemental irrigation was used once in August 1986 and April 1987 and twice during August 1987 applying 2 inches of water each time. Insect pests were a minor problem.

Treatments were applied using a completely randomized block design with 4 replications. Plots were 20 feet long by 3 rows wide with data being recorded for plants harvested from the center 15 feet of the center row. Differences between treatments were assessed using analysis of variance procedures.

RESULTS AND DISCUSSION

Percent live plants was lowest as a result of July budding for Tiffany and as a result of June and July budding for Peace (Table 1). Percent live was also reduced as a result of July budding for Mr. Lincoln when compared to the May budding treatment, but the difference was not significant. There was no difference due to budding for Blaze, but percent live was low for this cultivar. The differences between budding dates was generally due to a reduction in percent halves. For Peace, percent halves for the June and July dates was lower than for the May date though the difference was not significant. The percent twos resulting from June and July budding of Peace was lower than that seen for May budding, however (data not shown).

The decrease in budding success as a result of the later budding dates could be due to a number of reasons. The most likely reasons are temperature and water stress. The average minimum and maximum daily temperatures that the healing grafts were exposed to under field conditions increased steadily with budding date (Table 2). However, rainfall was also decreasing during the same period. Plants budded in July were presumed to be under more drought stress than plants budded in May or June, but plant water status was not measured. The separation of these two factors using field experiments is very difficult. In addition, plant size normally increases rapidly during this period and could affect bud graft survival. Currently, greenhouse experiments are in progress to evaluate the effects of water stress on T-bud graft survival. More research is also needed to evaluate the effects of temperature and plant size on this important aspect of rose plant production.

The differential cultivar response to budding date indicates a need for budding date management that many commercial growers use to a certain extent. The current data indicate that cultivars like Peace and Mr. Lincoln should be budded in May, whereas, Tiffany could be budded in June. None of these cultivars should be budded in July. Blaze, however, exhibited the same bud live regardless of budding date, an observation commonly held in the industry. More specific information on cultivar responses would be desirable as the budding season is necessarily long in order to make best use of available labor.

Table 1. Yield data for rose plants T-bud grafted at three different times. All percentage data were based upon the number of rootstock plants originally planted.

Cultivar	Budding Date	% Live Plants	% Ones and Halves	% Halves
Mr. Lincoln	May	68[z]	48	23
	June	53	28	13
	July	39	26	8
Anova				
Linear		NS[y]	NS	* (10%)
Quadratic		NS	NS	NS
Tiffany	May	73	49	24
	June	67	48	24
	July	8	6	2
Anova				
Linear		**	**	**
Quadratic		*	*	*
Peace	May	89	49	20
	June	52	35	13
	July	63	42	13
Anova				
Linear		*	NS	NS
Quadratic		*	NS	NS
Blaze	May	43	30	8
	June	48	36	13
	July	42	38	13
Anova				
Linear		NS	NS	NS
Quadratic		NS	NS	NS

[z]All percent data were analyzed using the Arcsin $\sqrt{x}$ transformation.

[y]NS, *, **, Nonsignificant or significant at the 5% or 1% level, respectively.

Table 2. Weather data from Overton, TX during the T-bud grafting operations in 1986.

	May	June	July
Average Daily Maximum Temperature (°F)	81.5	88.3	94.7
Average Daily Minimum Temperature (°F)	61.3	68.9	72.9
Total Rainfall (inches)	7.0	6.6	0.7