

## VARIABILITY AND CORRELATION OF YIELD AND TREE GIRTH IN APPLES IN THE STANTHORPE DISTRICT, QUEENSLAND

As part of an investigation of the mite problem on apples in the Stanthorpe district, it was desirable to assess the effect of mite damage to the foliage on the yield of numbers and weight of fruit. A prerequisite to this study was the calibration of the individual trees in respect of yield.

Three trials were undertaken on trees available in commercial apple orchards in both 1954 and 1955. Each comprised a block of 36 trees selected for apparent uniformity of size, one on the variety Delicious (Trial 1) and two on the variety Granny Smith (Trials 2 and 3). All trees were mature and bearing, approximately 15 years old and planted on Northern Spy rootstock.

Complete counts were made of all fruit, i.e. both harvested and windfalls, in each of the two seasons. The fruit from each tree were weighed and the weights recorded to the nearest half-pound. Tree girths were taken to determine whether yields of trees could be correlated with basal girths. These were measured at a point approximately midway between ground level and the crotch of the tree. The measurements were made during the dormant season, using a flexible steel tape, and recorded to the nearest millimetre.

From analyses of the data, the approximate means, together with their coefficients of variability and selected correlation coefficients, are given in Table 1.

**TABLE 1**  
VARIABILITY AND CORRELATION OF YIELD AND TREE GIRTH IN APPLES

Trial	Year	Weight of Fruit (lb per Tree)		Number of Fruit per Tree		Tree Girth (cm)	
		Mean (36 Trees)	Coefficient of Variability	Mean (36 Trees)	Coefficient of Variability	Mean (36 Trees)	Coefficient of Variability
Trial 1 (Delicious)	1954	112.03	23.9	513.33	23.4	39.03	10.2
	1955	65.61	81.3	268.19	83.1	39.34	10.1
Trial 2 (Granny Smith)	1954	200.60	20.2	772.72	24.9	45.57	12.7
	1955	70.28	92.3	185.19	94.5	46.14	12.7
Trial 3 (Granny Smith)	1954	189.50	37.1	639.58	40.1	42.83	9.6
	1955	193.64	22.3	658.19	28.2	43.52	9.4

TABLE 1—*continued*

Trial	Year	Correlation Coefficients					
		Weight of Fruit with Girth	Weight of Fruit 1954 + 55 with Girth 1954	No. of Fruit with Girth	No. of Fruit 1954 + 55 with Girth 1954	No. of Fruit 1954 with No. of Fruit 1955	Weight of Fruit 1954 with Weight of Fruit 1955
Trial 1 (Delicious)	1954	.2510		.3285*			
	1955	.4994**	.5105**	.5455**	.6471**	.0231	.3240
Trial 2 (Granny Smith)	1954	.6538**		.5069**			
	1955	.2757	.5317**	.2984	.5858**	.0012	.2208
Trial 3 (Granny Smith)	1954	.7303**		.7575**			
	1955	.3601*	.7157**	.4486**	.7801**	.2582	.2879

\* Significant at 5% level.

\*\* Significant at 1% level.

Yields were very variable, particularly in Trials 2 and 3 in the 1955 season. A broad correlation was established between yield and tree girth. There was, however, little correlation between the yields of the 1954 and 1955 seasons. In addition, an examination of the data for individual trees failed to reveal the yield relationship associated with biennial bearing usually considered a characteristic of apple trees.

In view of the variability shown in the trials it was unlikely that reasonable yield differences due to miticide treatments would be demonstrated on these blocks of trees. It would appear therefore that work of this nature to be of practical value would be possible only on blocks of trees selected from highly uniform planting material and grown under highly uniform conditions.

M. BENGSTON,  
Queensland Department of Primary Industries.

(Received for publication May 15, 1964)