Research Note

PSEUDOSTEM DIAMETER AS AN INDEX OF RELATIVE BUNCH WEIGHT IN PLANTAINS[1][2]

Plantains (*Musa acuminata* × *M. balbisiana*, AAB) are a valuable crop with a rather long crop cycle of 12 to 17 months from planting to harvest, depending on ecological conditions. In plantain experiments the plants may be exposed to gale-force winds which often destroy some plants before harvesting, with the consequent loss of experimental data.

Because of this possibility, the use of a statistical model to estimate the potential yield of a plantain plant or plot well before harvest would be very useful.

Lossois[3] studied the relationship between bunch weight and circumference of the pseudostem of the banana plant (*M. acuminata*, AAA) at various stages of growth. He reported a positive relationship in the Dwarf Robusta cultivar and suggested that the best correlation was established when the measurements were obtained 1 m above ground level at the time of bunch shooting. It is assumed that, at this stage, apical growth of the main pseudostem has ceased and no further enlargement of the trunk occurs.

This paper presents the results of a study on the relationship between bunch weight and pseudostem diameter in a population-density experiment. The work was conducted at Corozal, Puerto Rico, using Maricongo, a tall cultivar that normally reaches 11 to 13 feet in height there. Details of the experimental procedure used in recording the data presented herein were described by Irizarry et al.[4]

Table 1 shows that bunch weight can be predicted from pseudostem diameter measurements in plantains by employing a linear regression equation. The coefficient of correlation (r) was highly significant in all cases for each plant spacing and in all combined treatments ranging from 0.578 in the closer spacing of 5 by 5 ft, with 60 observations, to 0.648 in the 6 by 6 spacing, where only 28 plants were measured. The r value for all plants in the trial was 0.632, based on a total of 217 observations.

[3] Lossois, P., The development of a technique for crop forecasting in banana cultivations, The Banana Industry and Research, Developments in the Caribbean, Caribbean Organization, San Juan, P.R., 145–60, 1964.

[4] Irizarry, H., Green, J. J., and Hernández, I., Effect of plant density on yield and other quantitative characters of the Maricongo plantain (*Musa acuminata* × *M. balbisiana*, AAB), J. Agr. Univ. P.R., 59(4): 245–54, 1975.

TABLE 1.—*Regression equation of formula Y = a + b X for estimating bunch weight (Y) from trunk diameter (X) in plantains*

Plants per acre and spacing	Bunch mean weight	Trunk mean diameter	Intercept	Coefficient of regression	of correlation	Standard error of regression coefficient
Number and feet	*Pounds*	*Inches*				
	Y	X	a	b	r	
871 (10 × 5)	27.1	6.3	−7.23	5.46	0.637**	1.04
1,089 (10 × 4)	32.3	6.8	−5.76	5.58	.607**	1.18
1,210 (6 × 6)	29.3	6.4	−30.22	9.26	.648**	2.10
1,452 (6 × 5)	27.7	6.4	−17.84	7.06	.637**	1.29
1,742 (5 × 5)	23.6	6.3	−9.72	5.27	.578**	.97
All distances (Pooled data)	27.5	6.4	−16.01	6.75	.632**	.56

Since there were no significant differences among regression coefficients, the regression equation estimated from the whole plant population may be used to predict plantain bunch weight from the pseudostem diameter in areas with ecological conditions similar to those of Corozal.

These results show that plantain field experimentation may benefit by measuring, at the time of bunch shooting, the pseudostem diameter for possible use in adjusting yield data, should adverse weather cause losses.

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