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NON-DESTRUCTIVE METHOD OF MEASURING VOLUME AND WEIGHT OF PAPAYA FRUIT

A.ARJUNAN[1], K.BALAKRISHNAN[2], N.NATARAJARATNAM[3] and C.RAJENDRAN[4]

ABSTRACT

An attempt was made in papaya cultivars non-destructive analysis by simple linear regression, Y = + bx. The fruit volume (Y) can be predicted through both by fruit length (X), (Y = - 1167.29 + 147.38 x; r = 0.9627**) Circumference (Y = -1091.99 + 59.21 c) r = 0.9433, and also by the product of height (X) and circumference (C) (Y = -213.0 + 2.01 (X x C); r = 0.9858**). The fruit weight (Y) can also be predicted both by height (X) (Y = - 1170.43 + 151.09 x; r = 0.9402**) and product of X x C (Y = -191.61 + 2.06 X; r = 0.9873**) This sutdy will be helpful to measure the volume and weight of the fruit in situ without destroying the fruit.

INTRODUCTION

The papaya (*Carica papaya* L.) is an important tropical fruit crop in India. It is an usual practice to remove the young fruit the plant for studying the growth and development of papaya fruit. Sometimes the young fruits have also to be removed for studying the relationship between volume and weight of the fruit with the apain produced. This kind of practice lead to the removal of large number of young fruits before ripening. In view of this fact, an attempt has been made in this present study to measure the volume and weight of the payaya fruits *in situ* without removing the fruit from the plants.

MATERIALS AND METHODS

The experiment was laid out under field conditions at Tamil Nadu Agricultural University, Coimbatore. The chosen varieties were namely, Co.1, Co.2, Co.4, Co.5, Sunrise solo, CP-18, Washington, Redflesh, Giant and Pusa 1-45 (V). Five fruits in each variety were removed at 30 days after fertilization upto 150 days with an interval of 30 days. The volume was measured by water displacement

1. Associate Professor Crop Physiology, TRRI, Aduthurai - 612101
2. Assistant Professor Crop Physiology
3. Dean, (Retd) Pandit Jawaharlal Nehru College of Agriculture, Karaikal - 609 605.
4. Assistant Professor Crop Physiology, Agrl. College and Research Institute, Coimbatore

Table 1. Mean performances of linear measurements and predicted and actual values

S. No.	Range	Fruit length (X) cm	Fruit circum-ference (C) cm	Product of length and circum-ference (X x C)	Predicted volume CC			Actual volume CC	Predicted weight (g)			Actual weight (g)
					X	C	(X x C)		X	C	(X x C)	
1.	Minimum	8.5	16.4	136.0	85.00	234.31	60.36	35.00	113.84	66.74	88.58	45.00
2.	Maximum	25.2	56.2	1416.24	2546.27	2235.61	2633.64	2600.0	2637.04	2302.53	2603.00	2800.00
3.	Mean	17.73	46.54	825.25	1445.75	1663.84	1445.75	1445.75	1508.39	1727.47	1508.41	1508.00

when fruit was immersed in a jar. The maximum length (X) and circumference (C) were measured for individual fruit. The product of (X x C) by regression equation viz., Y = a + bx where Y = volume or weight, X = length and X = X x C)length x circumference) were also worked out. The predicted data were subjected to statistical analysis and correlation coefficient was worked out (Snedecor and Cochran, 1967).

RESULTS AND DISCUSSION

Data on the mean performance were presented in Table 1. There were wide variations in fruit length (X), circumference (C), product of X x C, volume and of actual and predicted values for the varieties studied. The mean length (X) and circumference (C) were 17.73 cm and 46.54 cm, respectively. The fruit volume was predicted through all the three measurements namely fruit length (Y = -1167.29 + 147.38 X; r = 0.9627**), circumference (Y = -1091.99 + 59.21 C; r = 0.9433**) and the product of X x C (Y = -213.0 + 2.01 (X x C); r = 0.9858**). However, no difference could be observed between the actual (1445.00 CC) and predicted values by length and also by X x C (1445.75 CC) measurements.

The fruit weight was also (Table 2) predicted by fruit length (Y = -1170.43 + 151.09 X; r = 0.9402**), fruit circumference (Y = - 1043.06 + 59.53 C; r = 0.9510**) and also by the product of X x C (Y = -191.61 +2.06 (X x C); r = 0.9873**). Here also there was not much difference between actual weight (1508.0 g) and predicted weight by length (1508.39 g) and X x C (1508.41 g). Though not much work was done in this aspect in papaya, similar line of study for dry matter prediction based on the leaf number and stem diameter has been reported in corn (Ross and Vlasova, 1966), grasses (Evans *et al.* 1961), coffee (Wormer and Ngugi, 1968) and also in pigeonpea (Hammerton, 1977).

From this study, it could be concluded that the weight and volume of papaya fruit

Table 2. Simple correlation and regression of linear measurements with fruit volume and weight

S. No.	Measurements	Fruit volume (CC)		Fruit weight (g)	
		Regression	Correlation	Regression	Correlation
1.	Length (X)	Y = −1167.29+147.38 (X)	r = 0.9627**	Y = −1170.43 + 151.09 (X)	r = 0.9402**
2.	Circum-ference(C)	Y = −1091.99+59.21 (C)	r = 0.9433**	Y = −1043.06 + 59.53 (C)	r = 0.9510**
3.	X x C	Y = −213 + 2.01 (X x C)	r = 0.9858**	Y = −191.61 + 2.06 (X x C)	r = 0.9873**

can be assessed *in situ* by measuring the height and circumference of the fruit. The findings may be helpful to the who are interested in studying the growth and development of the papaya fruit without removing the fruit by non-destructive analysis. In addition, it will save lot of time and labour, besides avoiding destruction of valuable economic materials.

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AN ECONOMIC ANALYSIS OF MARINE PRODUCT EXPORT FROM INDIA

S.DEVARAJAN

ABSTRACT

Trend lines were fitted to predict the growth rate for marine product from India to other countries. The total marine product export increased at 8.55 per cent and the value by 22.56 per cent. Share of shrimp to total marine product export increased from 54.0 per cent in 1960 to 58.41 per cent in 1986. While the value increased from 70.22 per cent to 82.12 per cent for theabove period indicating the prawn forms major share. The analysis of market share revealed that Japan and U.S.A. are the two major importers of marine products accounting for 44.85 per cent and 12.96 per cent while the value by 67.62 per cent and 12.48 per cent respectively. Since the prawn forms major share in marine product export, it is necessary to revitalise the Industry by providing liberalised credit to processors to introduce new technologies by sophisticated machineries offering tax concessions to traders and arranging participation in the world fairs.

The crustaceans comprising of prawns, lobsters and crabs receive much attention in marine fisheries due to their export importance and their high unit value. Among these, prawn has the major share accounting for 22 per cent of landed wet weight with its value exceeding 60 per cent. The status of prawn fisheries was examined at macro-level which would help fishery's sector to identify the bottlenecks for poor catch and remove such impediments so as to boost up exports of marine products. Hence, an attempt was made to analyse the pattern and directioin of trade for fisheries products.

METHODOLOGY:

Time series data were collected the Statistics of marine product export and Annual marine product export review published by Marine Product Export Development Authority, Cochin. Trend lines were fitted to predict the growth rate of marine product exports, different forms of shrimp export such as frezen prawn, canned prawn and dried prawn, and market share by major importing countries. Compound growth rates were worked out from the extimated equations and inferences were drawn to explain the prawn fishery in relation to its export importance.

Associate Professor, Tamil Nadu Rice Research Institute, Aduthurai.