NOTE: EFFECT OF SETT TYPE ON THE PERFORMANCE OF *TUGUI* [*Dioscorea esculenta* (Lour) Burk.]

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ABSTRACT

Sett types of *tugui* [*Dioscorea esculenta* (Lour) Burk.] could be arranged in order of increasing mortality and decreasing yield as follows: wholes, heads, tails and middles. Whole setts and middle setts had the highest and the lowest percentage emergence, respectively. The inability of some setts to germinate was attributed to tuber rot that resulted in death of setts. The number of sprouts did not differ among sett types but yield significantly differed mainly due to differences in mortality among sett types.

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KEY WORDS: *Tugui* [*Dioscorea esculenta* (Lour) Burk.]. Sett type. Emergence. Mortality. Sprout. Tuber yield.

Tugui [*Dioscorea esculenta* (Lour) Burk.] is one of the cultivated yams in the Philippines. Like most root crops, it is usually grown in small scale and its tubers are primarily used as substitute for rice and corn, the staple food crops in the country.

As in other yams, tubers are the planting materials used in the production of *tugui*. However, farmers do not slice the *tugui* tuber but instead use whole tubers. This practice is uneconomical especially in varieties that ordinarily produce relatively large tubers and either none or only few small ones. Even though large planting materials may produce higher yields per stand, the yield per unit weight of planting material tends to decrease as weight of planting material increases (Onwueme, 1978). It is therefore desirable to control the size of the planting material used. One way to do this is to utilize sliced tuber pieces rather than whole tubers. Use of tuber pieces is particularly useful when rapid propagation of the crop is desired. Small tuber pieces are preferable to large ones because of their higher multiplication ratio (Onwueme, 1982). However, one needs to know beforehand whether *tugui* tuber pieces will be as good as whole tubers in terms of germination and yield, hence, this study was conducted.

PRE-008, a *tugui* cultivar exhibiting a wide variety of tuber sizes, was used in the experiment. Large tubers of this cultivar were selected and sliced into 100-gram pieces (setts). Head, middle and tail setts were separated and cut surfaces were treated with wood ash. One hundred-gram whole tubers were also selected to serve as control. Setts were planted right after treatment with wood ash.

The experiment was set up in an area with sandy clay loam soil using the randomized complete block design. Each treatment (sett type) was replicated 3 times. Plot size was 4.0 m x 7.5 m. Setts were planted 75 cm apart on ridges spaced one meter apart at a depth of 10 cm.

Data on temperature, relative humidity and rainfall during the first 2 months were obtained. Sett emergence was observed weekly starting from the fourth week and yield data were gathered in February of the following year.

Percent emergence varied among the different sett types (Fig. 1). Whole and head setts sprouted more readily than tail and middle setts, and reached their maximum percentage emergence at 5 and 6 weeks after planting, respectively. Middle and tail setts reached their maximum percentage emergence at 7 weeks after planting. These results support the finding of Onwueme (1978) that head setts differentiate and sprout more readily after planting than non-head setts. The whole and head setts both with the head region of the tuber, thus sprouted relatively earlier.

The climatic conditions during the first 2 months of the study are presented in Table 1. Under these conditions, rotting of setts in the field was considerable and ultimately resulted in the inability of the infected setts to produce sprouts.

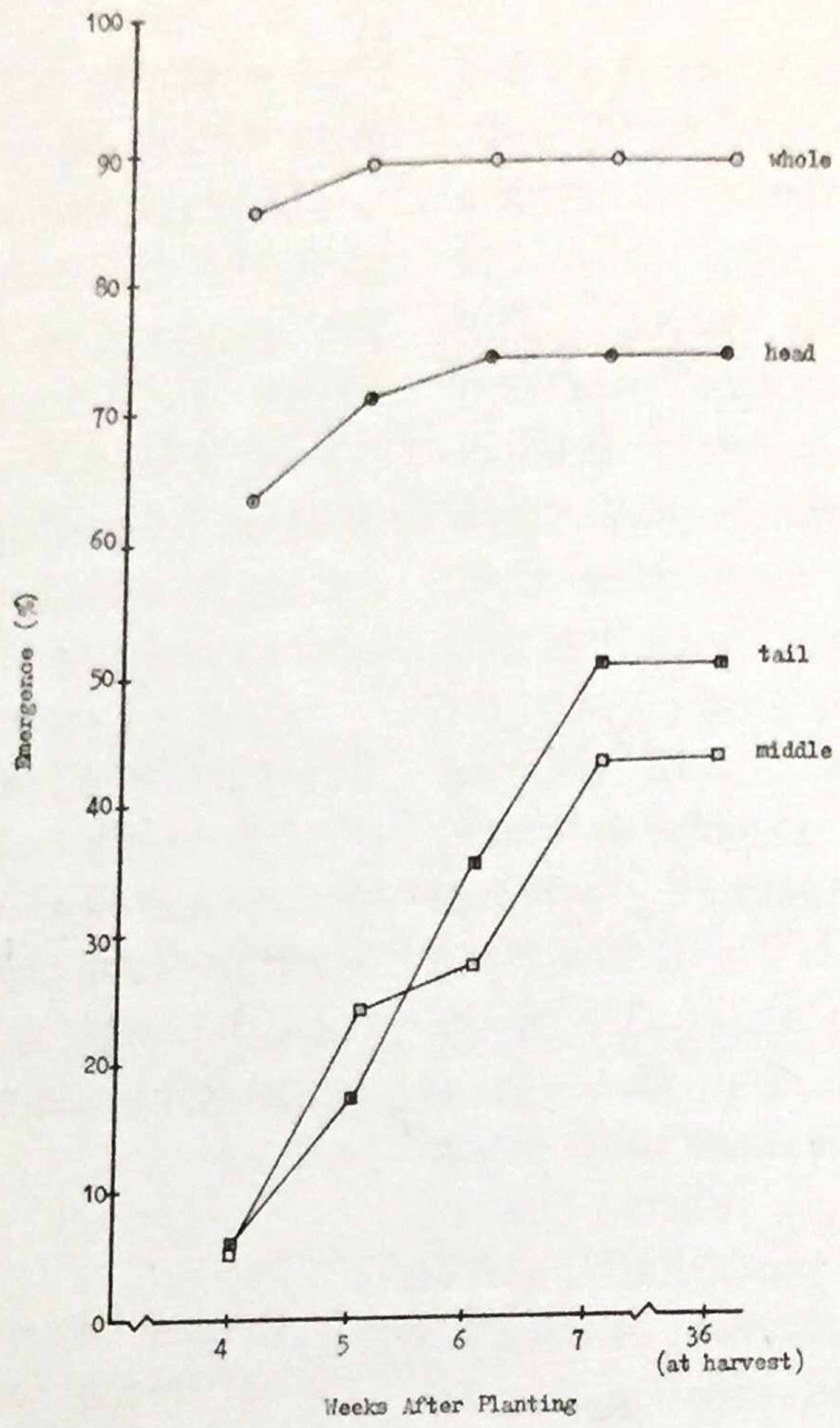

Figure 1. Percent emergence of various *tugui* sett types at different periods after planting.

Table 1. Air temperature, relative humidity, and rainfall during the first 2 months of the field experiment.

Month	Temperature (°C)		Relative Humidity (%)		Rainfall (mm/day)	
	Mean	Range	Mean	Range	Mean	Range
June	28	23-33	83	75-96	17.5	0-35
July	27	22-33	86	64-98	29.0	0-58

Table 2 presents the percent sett mortality per plot, number of sprouts per sett, and yield of *tugui* as affected by sett type. Among sett types, mortality significantly increased in the following order: whole, head, tail and middle.

As mentioned by Onwueme (1978), the greater the cut surface area on the sett, the greater is its tendency to rot after planting. This is because cut surfaces are weak areas wherein rotting can begin. Thus, it may be postulated that since whole setts are

Table 2. Percentage sett mortality, number of sprouts per sett and yield of *tugui* as affected by sett type.[1]

Sett Type	Percent Sett Mortality	Number of Sprouts/Sett	Yield (kg)/ Plant	Yield (tons)/ Ha
Whole	12.5c	1.89	1.91	21.40a
Head	25.0b	1.75	1.69	15.96ab
Middle	57.5a	2.23	1.77	10.18b
Tail	50.0a	1.83	1.62	11.02b
C.V. (%)	16.98	15.72	18.64	20.48

[1] Means within a column followed by a common letter are not significantly different at 5% level, DMRT.

protected by the peel and have no cut surfaces, they are least infected with microbial rotting agents. On the contrary, the middle setts are mostly infected with microbes since they have the greatest cut area (one towards the tail and one towards the head). This supports the contention of Onwueme (1978) that middle setts are least preferable as planting materials.

No significant differences in number of sprouts per sett were noted among sett types (Table 2). This indicates that the different types of sett developed comparable number of sprouting loci inspite of differences in area with peel.

As expected, the yield/ha among sett types significantly decreased (Table 2) in the following order: whole, head, tail and middle. The yield/ha of head setts was not significantly different from that of other sett types. However, whole setts yielded significantly higher than middle and tail setts. Since yield/plant (which did not include the missing hills resulting from rotting of setts) did not significantly vary among sett types, the observed significant differences in yield on per hectare basis could mainly be ascribed to the differences in mortality rates among sett types primarily due to rotting after planting. Sett type *per se* has been reported by a number of authors (e.g. Lyonga et al., 1973) to affect yam yield. The results of the present study on *tugui* may or may not agree with such reports depending on whether or not tendency to rot is considered a constituent part of the sett's characteristics. However in a similar study on *ubi (Dioscorea alata* L.) conducted at the Philippine Root Crop Research and Training Center, no significant differences in yield among sett types were noted (Dingal et al., 1985).

The foregoing results suggest that effective control measures against tuber rot should be adopted so that tuber pieces can be utilized in *tugui* production. If effective control measures against tuber rot are not available, only whole setts and head setts can be used as planting or propagating material. The middle and tail portions of the tuber which are more prone to rotting should be reserved for consumption.

LITERATURE CITED

DINGAL, A.G., PIDO, N.L. and ECLEO, D.G. 1985. Effect of different types of sett on the performance of ubi *(Dioscorea alata* L.). Radix 7(1):15-16.

LYONGA, S.N., FAYEMI, A.A. and AGBOOLA, A.A. 1973. Agronomic studies on edible yam in the grassland plateau region of the United Republic of Cameroon. Proc. Third Symp. Soc. Trop. Root Crops (Leakey, C.L.A., ed.). December 2-9, 1973. Ibadan, Nigeria. pp. 340-346.

ONWUEME, I.C. 1978. The Tropical Tuber Crops. John Wiley & Sons, Chichester. 234 p.

ONWUEME, I.C. 1982. A strategy package for reducing the high labour requirements in yam production. Yams/Ignames (Miege, J. and Lyonga, S. N., eds.). Clarendon Press, Oxford. pp. 335-345.