Whole seed corm production of elephant foot yam in laterite rainfed ecosystem through agronomic manipulation

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Characteristics of the experimental zone

Climate: Humid sub- tropical
$21^0 45'$ to $24^0 35'$ N latitude
$85^0 45'$ to $88^0 25'$ E longitude
78.77 m altitude

Soil fertility: poor
Soil pH: 5.5 to 6.0

Average rainfall: 1100 to 1300 mm
Max. temperature: 43 degree C
Min. temperature: 10 degree C

Rationale

- The Crop is popular due to its high productivity, non-irritant taste, and maximum monetary return within a short period.
- Being vegetatively propagated, it takes long time to reach the elite varieties to the end users and huge quantity of seed corms are required to plant per unit area.
- About 4000 to 5000 tonnes of seed corms are imported from southern states for which seed corms become costly and damaged due to long transportation.

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Rationale

- Lack of authentic agency to supply bulk quantity of optimum size (500-600 g) seed corms of elite varieties.
- Commercial growers in the intensive cropping zone are not keen to keep the crop up to maturity.
- The vast mono cropped areas of Red and Laterite Zone can be exploited through rainfed seed production programme.
- This zone can also be benefited through supply of quality seed materials to commercial growing areas at reduced rate.

OBJECTIVES

- To obtain whole seed corm of optimum size through mini corm setts.
- To standardize sett size, planting distance and fertilizer levels.
- To work out the economic analysis of whole seed corm production at rainfed ecosystem.

Methodology

First approach

- Apical mini corm setts (cv. Sree Padma) of two sizes (100 g and 200 g) were planted at three different spacing (50x30cm, 50x40cm and 50x50cm) during 1st week of July.
- The crop was fertilized with 75:50:75 kg/ha N:P:K. Whole of P_2O_5 and 1/3 rd of N and K were applied as basal whereas rest of N and K were applied in two equal splits at 60 and 90 days after planting (DAP)
- Design: Factorial RBD (Gomez and Gomez, 1983).

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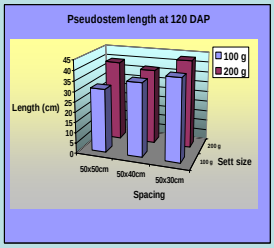
Methodology

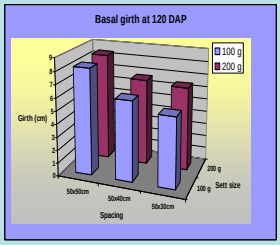
Second approach

- 200 g size of apical corm setts were planted at 50 cm spacing in both ways during 1st week of July.
- Two released varieties (Bidhan Kusum and Gajendra) were tested against three NPK levels (50:25:50, 75:50:75 and 100:75:100 kg/ha).
- Design: Factorial RBD (Gomez and Gomez, 1983).
- Linear multiple regression on seed corm weight was computed with pooled values of the two experiments as per the method of Dewey and Lu (1959).

RESULTS

Effect of sett size and spacing on growth characters

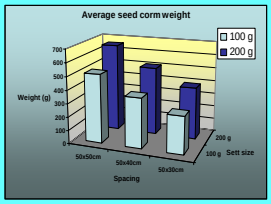


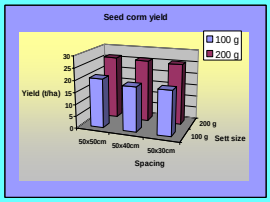


- Closely planted setts showed higher pseudostem length than wider planting.
- Wider planted setts showed higher basal shoot girth than closer planting.

RESULTS

Effect of sett size and spacing on seed corm weight and yield





- The weight of seed corm increased with bigger sized corm setts and wider spacing.
- Lower the sett size higher was multiplication rate (1:5) as against (1:3) in higher sett size.
- The highest seed corm yield (26.35 t/ha) obtained with bigger corm setts planted widely.

RESULTS

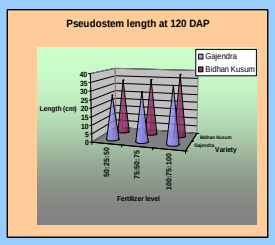
Simple linear multiple regression

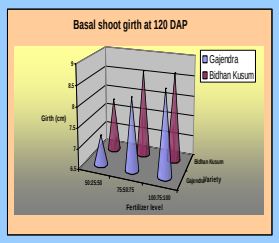
Y= -664.91-7.767 (Polar girth) +4.11* (equatorial girth)-4.364* (shoots/hill) +3.46 (basal shoot girth)

Where, Y= seed corm weight (g), estimated R^2 = 0.827 **

RESULTS

Effect of variety and fertilizer level on growth characters

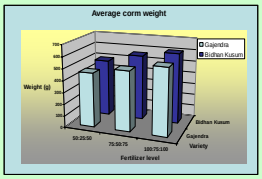


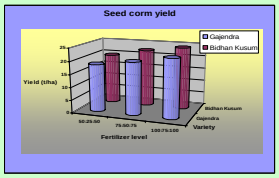


The length and basal girth of pseudostem was found maximum in Bidhan Kusum at higher fertilizer level.

RESULTS

Effect of variety and fertilizer level on seed corm weight and yield





- **Bidhan Kusum gave the maximum corm weight (603.60 g) at higher NPK level.**
- **With the increase in fertilizer level, the seed corm yield increased.**
- **The maximum seed yield (24.14t/ha) was obtained with Bidhan Kusum at higher NPK level.**

RESULTS

Simple linear multiple regression

Y= 171.304-1.960 (Polar girth) + 3.663 (equatorial girth) + 5.138 (shoots/hill) +34.809* (basal shoot girth)

Where, Y= seed corm weight (g), estimated R^2 = 0.3186 *

Economics of whole seed corm production

Particulars of expenditure	Total amount (Rs.)
1. Quantity of seed materials (80 quintal/ha) @ Rs. 800/- per quintal of bigger sized (4-5 kg) seed corm	64,000=00
2. Cost of land preparation, other inputs (Fertilizers, pesticides etc) and labour wages (Rs.70/- per mandays) for cultivation	37,500=00
3. Total cost of cultivation	1,01,500=00
4. Total income (seed corm yield 241.4 quintal/ha selling @ Rs.1000/- * per quintal)	2,41,400=00
5. Net income	1,39,900
6. Income per rupee investment	1.37

* **The cost of optimum whole seed corm size (weighing about 500-600 g) is sold at higher prices.**

Ideal whole seed corm size for planting

Conclusion

- The highest seed corm weight and consequently seed yield was obtained with 200 g mini corm setts planted at a spacing of 50 cm in both ways.
- Crop received with higher level (100:75:100 kg/ha) of NPK gave better response towards growth and seed corm productivity.
- Linear multiple regression revealed positive influence of basal shoot girth and equatorial girth of corm towards average seed corm weight.
- The income per rupee investment was Rs.1.37/-.
- Thus, the optimum seed corm size could be obtained successfully at rainfed laterite ecosystem of West Bengal.