



Importance and Role of Maintenance Breeding in Self – Pollinated crop: Finger Millet (Eleusine coracana)

Biswa sankar Das

Senior Programme officer, Watershed Support Services & Activities Network (Wassan), Odisha Millets Mission

Abstract

Maintenance breeding is the most importance to varietal genetic stability improvement through a series of field experiments under favorable conditions .It plays an importance role in self-pollinated crops to establish a unique seed characters of both phenotypic and genotypic appearances to establish a quality seed without any genetical changes .Self-pollinated crops are always produce heterogeneous seeds by nature in where the seed characters are variable in both phenotypic and genotypic expression .so, in self pollinated crop like Finger millet (Eleusine coracana) the seed development to form a nucleus seed type is easily possible by a experimenting a series of field experiments with specially focus to selection and rejection process by the custodian farmer ,by the scientist without any Hybridization process

Keywords: *Breeding ,Maintenance breeding ,Phenotypic ,Genotypic ,Self –pollinated , Nucleus seed*

Introduction

Maintenance breeding refers to germplasm improvement process for overcoming disease, pest and improving high grain quality or eliminating other defective factors that may constrain production and grain marketability. It deals with principles and methods of nucleus and breeder seed production and maintenance. It also deals with the maintenance of genetic and physical purity of the genetic material of the released or notified varieties.

In Maintenance breeding the nucleus seed production and the varietal purity of subsequently multiplied foundation, certified seeds largely depend upon the quality of nucleus and breeder seed. Unless the nucleus and breeder seed are the highest purity and the quality of the seeds multiplied from it cannot be degraded as satisfactory genetic purity.

Seed is the carrier of crop improvement technology resulting from plant breeding research. Good quality seed act as a catalyst for realizing the potential of all other inputs in

agriculture. Therefore, availability of good quality seeds of improved varieties to the farmers at an affordable price at right time is highly indispensable. The repeated use of seeds from generation to generation without renovation would lead to breakdown of varietal identity. Therefore, cycle of renovation and multiplication of seeds by generation system is more important to overcome the deleterious effects on farmers saved seeds. In the generation system of seed production, nucleus seed assumes importance as it forms the source for multiplication of the released varieties.

Objective

The Production and genetic maintenance of quality seed of a variety with maintaining the seed purity when it undergoes production year after year. This also involves maintaining morphological, physical purity and genetic purity of a variety for long period of time.

- To increase crop yield, to raise plants with desired characteristics, to develop disease

***Corresponding Author:**

Biswa Sankar Das;

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and pest resistant crop variety, to develop plants that can tolerate extreme environmental stress.

- In self-pollinated crops it involves the production of nucleus and breeder seed for the purpose of purifying and maintaining the variety by originating plant breeder or by supervision of a plant breeder.
- Systemic multiplication of seeds.
- Increase the homozygosity, which in turn can lead to an increase in homogeneity.
- Elimination of off-types, there by maintaining the stability.

Maintenance breeding, therefore, is the key to the purification and stabilization of released varieties and varieties to be released, which helps to disseminate and enhance the productive life of a variety. Combining the art and science of plant breeding with applied aspects of seed production is needed for the maintenance of plant varieties.

Materials & Methods

The field experiment was conducted at chitrakonda block of Malkangiri district, odisha during kharif 2023 (1st June - 30th December). The precise location of the experiment was 18.077153'N latitude, 82.08416'E longitude and an altitude of 434.7m above sea level.

The block chitrakonda was selected purposefully as Finger millet is the major

cereal crop grown in large area in kharif season. The soil of the experimental plot was slightly acidic in nature with sandy loam in texture. The trial field was medium upland where the water was drained easily during rainfall because Finger millet needs dry condition but slight moisture condition in soil. The Experiment was conducted in rainfed condition at normal nursery sowing to transplanting adopted by farmer.

Grow a Population of 4000 -5000 plants from the released genetic stock in where the stock may be drawn from the breeder seed maintained by the breeder. The seeds of the selected plants of each variety were sown in nursery for row progenies with maintaining 50 no's of plants in each row. The seedlings were transplanted with spacing of 20 x 25 cm(R x P) and 1 meter isolation gap distance in order to get more desirable plant population of each varieties without any cross pollination. The transplanting was made under favorable condition with the 28 days old, 2no's of seedlings in the row spacing as mentioned in different lines per each variety such as - A Line for V1 (Kalia), B Line for V2(Bharati),C- Line for V3(Bati) and D -Line for V4(Mami).All these varieties were selected from a series of evaluation and screening trials such as Participatory varietal trial,Multi location trial under rain fed and irrigated conditions.

A-Line(Kalia)	B-Line(Bharati)
Isolation gap	Isolation gap
C-Line(Bati)	D-Line(Mami)

	A -Line	B-Line	C-Line	D-Line
Variety-	Kalia	Bharati	Bati	Mami
Age of Seedling-	28 days	28 days	28 days	28 days
Spacing (P x R) cm -	20 x 25	20 x 25	20 x 25	20 x 25
No.of Rows -	33	33	33	33

*(To make uniform plot size the numbers of rows were same)

The growth and development of each variety were followed by various important operations like; weed management, organic nutrient management, organic pesticide management, rouging in different crop growth stage.

The yield attributing characters like Plant hight (Cm), Tillers hill⁻¹, EBT hill⁻¹, Panicle length (Cm), Fingers panicle⁻¹, Finger length (Cm), Flag leaf length (Cm),Grain wt. Panicle⁻¹,1000 grain wt.(gm.), Dry grain wt. (kg.), Dry straw wt.(kg),Seed yield (q ha⁻¹) at harvest of the crop were studied. The trait specific

characters were evaluated and the undesirable plant types were rejected and the remain seeds of the selected plant types were bulked which will use as nucleus seed in the next cropping season.

Results and Discussions

The results obtained from the present experiment are summarized below

Table-1: Mean growth and yield attributes of Finger millet varieties under rainfed conditions

variety	Plant height(cm)	Tillers/hill (no)	EBT/hill (no)	Panicl Length (cm)	Finger Length (cm)	Fingers/Panicl (no)	Flag leaf length(cm)	100 grain wt (gm)	Dry Grain Wt/Sub plot (kg)	Dry Straw Wt/Sub plot (kg)	Seed Yield (q/ha)
Kalia	90	2.0	2.0	8.4	7.3	6.0	26.8	2.93	12.5	60	8.81
Bharati	83.7	2.0	2.0	9.0	7.3	6.0	34.5	2.34	9.5	41	6.6
Bati	74.3	2.0	2.0	7.9	4.8	6.0	33.7	2.85	8	40	5.63
Mami	75.3	2.0	2.0	8.7	6.1	6.0	34.6	2.50	12	36.5	8.44

The most important yield attributing traits were tillers hill⁻¹, Finger length, Fingers panicle⁻¹, Weight of grains mother panicle⁻¹ & test weight with genetic qualities which are directly proposnal to yield and quality of seed. As in other phenotypic character it was observed that as the highest grain yield with quality seed recorded in the variety Kalia from traditionally locally grown was superior in quality nucleus seed production as well as other phenotypic characters followed by the genotype namely Mami from traditionally locally grown. Likewise the genotype Bharati was the third highest quality seed yield was superior in quality seed production as well as other phenotypic characters.

Conclusion

Based on the results of this trial, it can be concluded that the genotypes namely Kalia was superior in quality grain production as well as other phenotypic characters and the second highest quality grain production was recorded by the genotype Mami followed by the genotype Bharati.

Hence, it requires more emphasis on more selection of desirable phenotypes and genetic purification of these genotypes in this programme to improve quality seed of Finger millet.

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