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Registration of Simbo (CIP-313033.06) Potato (*Solanum tuberosum* L.) Variety

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ABSTRACT

The name Simbo was given to newly release common names for the potato (Solanum tuberosum L.) variety with the pedigree names of CIP-313033.06 which was developed by Bore Agricultural Research Center. The genotypes were introduced from Sinana and Holeta Agricultural Research Center and evaluated in order to select high yielding, disease resistant/tolerant and stable potato genotypes. Thus, fourteen (14) potato genotypes were evaluated in multi-location trial for two consecutive years (2022/23-2023/24) during 'belg' cropping season. From tested genotypes, Simbo (CIP-313033.06) was higher in marketable tuber yield, stable in performance and resistance to major potato diseases and also based on other desirable characteristics of internal and external quality traits. The Simbo potato variety gave means marketable ranged from 43.18 to 45.12 t/ha on research field and 50.61 to 51.66 t/ha on farmers field and it showed 50.88 to55.35% marketable tuber yield advantage over the standard checks, respectively. Accordingly, based on field evaluation recommendation by the NVRC members technical committee and other specialists potato variety Simbo was officially released in February 18/2025 for production in areas ranging from mid to high altitude in Guji zone and areas having similar agro-ecologies of Ethiopia.

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INTRODUCTION

Potato (*Solanum tuberosum* L.) belongs to the family *Solanaceae* and genus *Solanum* (Thompson and Kelly, 1972). Potato is one of the most important crops that contribute to food security on a global scale, due to its high yield per unit of cropland and time (Devaux *et al*., 2014). It is considered to be the world's fourth important food crop after maize, wheat, and rice because of its high yield potential and nutritive value (Kumar *et al*., 2013; Pandey *et al*., 2014) and the third most important food crop after rice and wheat is being grown and consumed in all over the world (FAO, 2022). Potato plays an important role both in human diet and processing industry (Zaheer and Akhtar, 2016). Potato is a major carbohydrate supplier in the diets of millions of people in the world. It is also contains about 79% water, 18% starch as a good source of energy, 2% protein and 1% vitamins including vitamin C, minerals including calcium and magnesium and many trace elements (Ahmad *et al*., 2011).Farmers consider potato as a transitional crop that helps them survive the severe and prevailing food shortage that occur every year (Semagn *et al*., 2007).

Generally, potato requires altitude 1800 to 2500masl (Bezabih and Mengistu, 2011), optimum soil temperature 16-19°C (Anonymous, 2004), high rainfall ranging between 1000 and 1500 mm per year (Gusha, 2014), temperate climates (Hijmans, 2003) and naturally loose soils, which offer little resistance for tuber enlargement, are preferred. Potatoes grow best in loose, well-drained, non-crusting, sandy loam or loam soils with high organic matter content and pH between 5.5 and 6.5(Martha and Ann, 2017). In Eastern Africa, Ethiopia is the major producer of potato, and 70% of the arable land is suitable for potato cultivation b/c of suitable agro ecology but the average national yield of potato 16.687 tha^{-1} (CSA, 2022), the average yield of potato yield (29.4tha^{-1}) in Guji zone (Dembi *et al*., 2017) also it is very low as compared to the yield in developed countries 40 to 50 tha^{-1}(FAO, 2023). This is due to biotic and abiotic factors are contributing for low productivity of potato including inappropriate agronomic practices, prevalence of disease and insect pests, poor soil fertility management, high cost of seed tubers, inadequate storage and marketing facilities (Menza *et al*., 2014). Potato varieties in cultivation were not able to meet the requirements of growers in terms of yield, late blight resistance, and quality, among others (Gebremedhin *et al.,* 2001).

Potato is one of the most important tuber crops grown in Guji zone, the southern parts of Oromia region. The highlands of this zone have vast plain arable land suitable for production of tuber crops and vegetables both under rain fed and irrigation condition. However, genotype, soil properties, climate, agronomic management, lack of high yielding and resistance to late blight varieties and quality planting materials constrained potato production small and large scale farms in the high land areas of Guji zone. The existing recommended potato varieties were found susceptible to late blight and become low yielder. Therefore, there is an urgent need to replace these varieties by developing better varieties, wider adaptable, high yielding, and early-maturing and disease-resistant potato varieties with characteristics desired by consumers and processors for the study area. Therefore, the objective of the study was to register high-yielding, having better-quality traits, stable, and disease-resistant/tolerant potato variety (ies) for Guji zones and having similar agro-ecologies of Ethiopia.

Variety Origin and Evaluation

Fourteen potato genotypes including two standard checks (Jalane and Gudane) were tested in the Regional variety trial for two consecutive years from 2022/23-2023/2024 at Bore, Ana Sora, and Arda Jila Districts. The origin screening genotypes were brought from Sinana and Holeta Agriculture Research centers. Based on, significantly high marketable tuber yield, Resistant the existing race of potato late blight, Post-harvest qualities like dry matter content, tuber shape, eye depth, and skin color two potato genotypes namely G3(CIP-313033.06) and G7(CIP-395126.6) were selected and verified at multi locations along with one check (Burka). The candidates G3(CIP-313033.06) and G7(CIP-395126.6) were evaluated during 2024 'Belg'cropping season at six locations (Bore District Bore on-station and Abiye Kutre on-farm, Ana Sora Disttrict at Raya Boda sub-site and Yirba Buliyo on-farm, and at Arda Jila District Mea Melka Gelma sub-site and Kilenso on-farm).Finally, G3 (CIP-313033.06) was released in 2025 by the name 'Simbo'Variety after evaluation by National Variety Release committee.

Morphological and Agronomic characteristics

Simbo is erect growth habit with average days to flowering and maturity of 62.11 and 109.72 respectively. The variety has medium plant height (62.11 cm). On the other hand, Tuber skin color is pink, Tuber eye depth is shallow and has the number of tuber per hill and Tuber weight of 11.14 and 117.60 g/tuber respectively (Table 1).

Yield performance

Simbo (G3) was tested together with 13 potato genotypes including check in regional variety trial at 6 locations in mid to highland areas of Guji zone during 2022/23- 2023/24 consecutive years. It was evaluated along with Gudane and Jalene varieties at altitudinal range of 2200-2750 meter above sea level at Bore, Ana sora and Arda jila districts in each year. During evaluation seasons, the overall location marketable tuber yield mean of this variety was better than all genotypes. Simbo showed 50.88-55.35% yield advantage over the s.ckecks (Gudane and Jalene). On research field *Simbo*

gave yield ranging from 43.18 to 45.12 t/ha, whereas 50.61-51.66 t/ha on farmers' field (Table 1).

Table 2. Agronomical and morphological characteristics of 'Simbo'

Characteristics	Simbo(CIP-313033.06)
1.Adaptation area:	
1.1. Altitude (masl)	2200 to 2750
1.2. Rainfall (mm)	600 to 850
2.Fertilizer rate:	
1.2. NPSB (kg/ha)	200
2.1. Urea (kg/ha)	150
3. Planting date	late March/Early April
4. Seed rate (qt /ha):	18
5. Days to flower	62.11
6. Days to maturity	109.72
7. Plant height (cm)	78.97
8. Number of tuber per hill	11.14
9.Tuber weight (g/tuber)	117.60
10. Dry matter content (%)	20.30
11.Specific gravity(gcm^3)	1.080
12. Starch Content (%).	20.30
13. Tuber shape	Elliptic
14. Tuber eye depth	Shallow
15. Tuber skin color	Pink
16. Tuber flesh color	Yellow cream
17.Disease reaction	Resistance
18.Marketable tuber yield (ton/ha):	
18.1. Research field	43.18-45.12
18.2. Farmer field	50.61-51.66
19.Year of release	2025
20. Breeder/Maintainer	BoARC/ORARI

Stability performance/Adaptation

Stability analysis was done on marketable tuber yield using 14 potato genotypes including checks were studied for two years across three locations. Simbo has shown stable yield performance across locations of evaluation as well as high mean marketable tuber yield over check variety. Yield stability in three genotypes was studied for one year across six locations. The result of the study revealed that' Simbo' was the best productive variety in marketable tuber yield performance and showed maximum stability. Based on an ideal genotype should have both high marketable tuber yield performance and high stability across environments (Kaya *et al*., 2006; Yan and Tinker, 2006).

In genotype focusing scaled comparison of GGE biplot, a genotype located nearest to the central concentric circles is both high marketable tuber yielding and most stable. The GGE bi-plot analysis for marketable tuber yield of Potato genotypes based on genotype focused scaling comparison is presented in Figure 1. An ideal genotype is defined as the genotype having the greatest PC1 score (high mean performance) and with zero G x E interaction, as represented by an arrow pointing to it (Figure 1). Figure 1 depicts that the G3 (Simbo) which fell in the first concentric circle, was the ideal genotype in terms of higher yielding ability and stable. Ideal test environment, which is the center of the concentric circles, has more power to discriminate geno types in terms of the genotypic main effect as well as ab le to represent the overall environments. Among the tes ting environments (Arda jila-2023, Ana sora-2022 and Bore-2022) were highly representative testing site Yan (2001) reported that ideal" test environment, which is a virtual environment that has the longest vector of all test environments (most discriminating) and it is located on the AE (most representative environment).

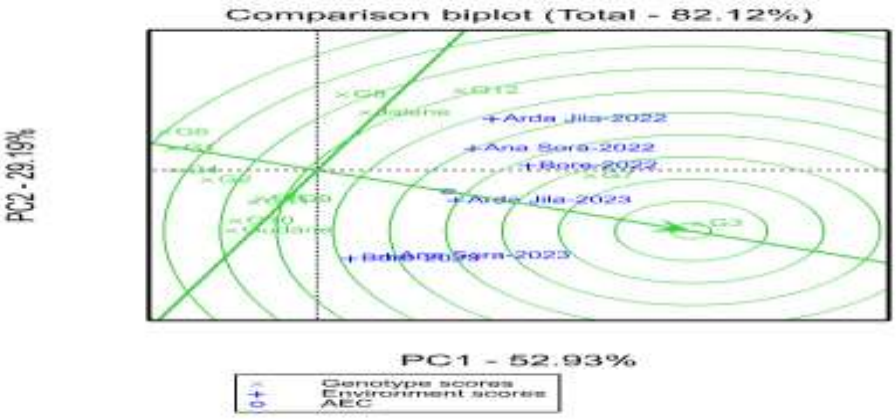

Figure 1: GGE bi-plot based on genotype-focused scaling for comparison of 14 genotypes for their yield potential and stability.

Reaction to major disease

The major potato disease according to their importance in the growing area is late blight. Generally, the variety (Simbo) had resistant reaction and less late blight attack and other abiotic factors.

Adaptation and Agronomic Recommendation

Newly released potato variety, Simbo is recommended for mid to highland growing areas. It performs very well at altitude ranging from 2200-2750 m.a.s. level. The seed and fertilizer rates recommended for Simbo variety is 18 qt/ha and 200/150 kg/ha (NPSB/ UREA) respectively. Fertilizer (UREA) application is in split form where; two times application (½ doses at planting and ½ doses at 15 days after emergency). Based on the onset of rainfall, planting time ranged from mid-March to early April.

CONCLUSION AND RECOMMENDATION

Simbo (CIP-313033.06) is high yielding and stable variety across all tested locations with desirable agronomic and morphological traits as compared to rest of the genotypes used in the study. Accordingly, it has been officially released for mid to high land areas of Guji zone and similar agro-ecologies of Ethiopia in 2025.Therefore, small holder farmers and other potato producer can be benefited from producing Simbo potato variety following full the nationally and specific area recommended agronomic production package.

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REFERENCES

Ahmad, N., Khan, M.A., Khan, N.A., Binyamin, R. and Khan, M.A. 2011, Identification of resistance source in potato germplasm against PVX and PVY. *Pakistan Journal of Botany*, 43(6), pp.2745-2749.

Anonymous.2004, Directory of released crop varieties and their recommended cultural practices. Ethiopian Agricultural Research Organization, Addis Ababa, Ethiopia.

Bezabih Emana and Mengistu Nigussie. 2011, Potato Value Chain Analysis and Development in Ethiopia Case of Tigray and SNNP Regions. Report submitted to International Potato Center (CIP-Ethiopia),c/o ILRI, P.O. Box 5689, Addis Ababa Ethiopia

CSA (Central Statistical Agency).2022, Report on Area and Production of Major Crops .Agricultural sample survey Addis Ababa Statistical Bulletin V.(1) pp: 143,10-111.

Dembi Korji and BashaKebede. 2017, On farm demonstration of adapted Potato (*Solanum tuberosum L.*) in Highlands of Guji zone, Oromia Region, Ethiopia. *Academic Research. Journal Agriculture Science*, Vol. 5(7), pp. 514-520.

Devaux, A., P. Kromann, and O. Ortiz.2014, Potatoes for Sustainable Global Food Security. Potato Res. 57, 185-199. Doi: 10.1007/ s11540-014-9265-1.

FAO (Food and Agriculture Organization). 2023, Food and Agriculture Organization of the United Nations International potential of Potato production, Rome, Italy.

FAO(Food and Agriculture Organization).2022,Role and Potential of Potato in Global Food Security pp.1-37

Gebremedhin,W., Endale, G., and Kiflu, B. 2001,National potato research program report. Ethiopian Agricultural Research Organization, Holetta Agricultural Research Center.

Gusha, S. 2014,From Potato Fields to Potato Sacks. Pastorial Response. Anglical Diocese of Harare, Zimbabwe.

Hijmans, R.J.2003,The effect of the climate change on Global Potato Production .

Kaya yukselAkçuramevlut and Tanerseyfi. 2006,GGE-biplot analysis of multi-environment yield trials in bread wheat. *Turkish Journal of Agriculture and Forestry*, *30*(5)325-337.

Kumar, C.V., Prakash, S.S., Prashantha, G.M., Mahendra, K.M.B., Lohith, S. and Chikkaramappa, T. 2013, Dry matter production and yield of potato as influenced by different sources and time of fertilizer application and soil chemical properties under rainfed conditions. *Research Journal of Agricultural Sciences,* 4(2): 155-159.

Martha and Ann. 2017, Organic Potato Production on the California's Central Coast: A Guide for Beginning Specialty Crop Growers by Jim Leap, Darryl Wong, Orin Martin, and Kirstin Yogg-Comerchero, PP.1-12.

Menza, M., Gebrerufael Girmay, G., Gamo, F.W.2014,Enhancing household food security through Potato production in Gamo Highlands of Southern Ethiop ia, Sch. J. Agric. Sci. 4 (7) 410–419.

Pandey, N.K., Dhiraj, K. and Kumar, R.S.2014, Summer School on "Current Trends in Quality Potato Production, Processing and Marketing" (8th to 28th July, 2014). Central Potato Research Institute, Shimla, New Delhi.

Semagn Asredie, Abdulwahab Aliyi and AbdissaYohannes.2007, Potato and sweet potato research achievements in North Shewa.*In*: Proceedings of the 1st annual Regional Conference on Completed crop Research Activities. 14-17. August, 2006, ARARI, Bahir Dar.

Thompson, H.C. and Kelly, W.C. 1972, Vegetable crops. Tata Mc Graw. Hill Publication Co.Ltd., New Dehil, pp: 372-385.

Yan, W. and Tinker, N.A., 2006.Biplot analysis of multi-environment trial data: Principles and applications. *Canadian journal of plant science*, *86*(3): 623-645.

Yan,W. 2001,GGEBiplot a Windows application for graphical analysis of multi-environment trial data and other types of twoway data. Agron. J. 93: 1111–1118.

Zaheer, K., and Akhtar, M. H. 2016, Potato production, usage and nutrition-a review. Critical reviews in food science and nutrition. 56(5): 711-721.

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