

Registration of *BaHa-jidu* and *BaHa-gudo* Groundnut (*Arachis hypogaea* L.) Varieties

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Abstract: The performances of eleven groundnut (*Arachis hypogaea* L.) genotypes were evaluated at 6 environments in eastern Ethiopia. Finally, the varieties *BaHa-jidu* (NC-AC-2748 X Chico) and *BaHa-gudo* (ICGV-88357) were approved for release in 2012 by the National Variety Release Committee. *BaHa-jidu* is the runner type and medium seeded, whereas *BaHa-gudo* is erect type and large seeded. *BaHa-jidu* gave 2.02 tons (t) ha⁻¹ of dry pod yield (DPY) and has a 19% advantage over the *Werer-962*, standard check. Similarly, the *BaHa-gudo* gave 1.97 t ha⁻¹ of DPY with a 16% advantage over the standard check. *BaHa-jidu* and *BaHa-gudo* were moderately resistant to rust and leaf spot diseases. The effects of genotype, environment, and their interaction explained 6.6, 84.7 and 8.7% of the total treatment variance, respectively. *BaHa-jidu* (0.026) and *BaHa-gudo* (0.044) had the smallest superiority measure values, which indicate best DPY performance and stability. In conclusion, *BaHa-jidu* and *BaHa-gudo* were recommended for production area of 1400 to 1650 meters above sea level.

Keywords: Babile; *BaHa-gudo*; *BaHa-jidu*; Eastern Ethiopia; Variety

1. Introduction

Groundnut (*Arachis hypogaea* L.) yield in the smallholder farmers is low, 1.1 tons (t) per hectare (ha) (CSA, 2008). Lack of high yielding varieties was among the major factors contributed to the low groundnut yield. Thus, the Oilseed Crops Research Program of the Haramaya University (HU) evaluated the performance of eleven groundnut genotypes at two locations (Babile and Likale) for three years in eastern Ethiopia, and then nationally released two varieties. The released varieties were named *BaHa-jidu* (NC-AC-2748 X Chico) and *BaHa-gudo* (ICGV-88357). 'Ba' stands for Babile, and 'Ha' stands for Haramaya. Thus, 'Ba' and 'Ha' in combination tends to express Babile Research Station under HU management. In addition, *Baba* in Oromifa expresses situation in the east. In connection to this, *BaHa* inclines to convey the location, eastern parts of Ethiopia, where the varieties were developed. The terms 'jidu' and 'gudo', in Oromifa, refer to medium and large seeded, respectively.

2. Origin and Pedigree

BaHa-jidu (NC-AC-2748 X Chico) and *BaHa-gudo* (ICGV-88357) were imported from the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), India.

3. Varietal Evaluation

The combinations of the locations (Babile and Likale) and years (2007, 2008 and 2009) were treated as 6 environments (Babile 2007, Babile 2008, Babile 2009, Likale 2007, Likale 2008 and Likale 2009). *Werer-962*, the best adapted variety in the tested sites, was used as the standard check. The experiment was arranged in randomized complete block design with three replications. The spacing between rows and between

plants were 0.60 and 0.10 meter, respectively. The number of rows per plot was five and data were collected from the middle three rows. Starter fertilizer was not applied into the soil during the experiment. The verification trial was also carried out in multi locations in 2011 and evaluated by the National Variety Release Committee. The committee approved two varieties for release in 2012. The experiment was arranged in randomized complete block design and analysis of variance was carried out with a statistical analysis system (SAS) version 9.0 software (SAS, Institute Inc., 2002). GenStat Discovery 2004 (Wim *et al.*, 2004) was used to analyze the yield and yield stability of groundnut genotypes.

4. Morphological Characteristics of the Varieties

BaHa-jidu and *BaHa-gudo* are distinct in their agronomic characteristics (Table 1). *BaHa-jidu* is a runner type and medium seeded, whereas *BaHa-gudo* is an erect type and large seeded. Both varieties are tan red in their testa color.

5. Yield Performance and Stability

The mean dry pod yield performance of the *BaHa-jidu* and *BaHa-gudo* varieties were found to be superior over the *Werer-962*, which is the standard check (Table 2). Additive main effects and multiplicative interaction (AMMI) of variance for dry pod yield at the six environments indicated that the effects of genotypes, environments and their interactions on yield were significant (P < 0.01). The effects of genotype, environment and their interaction explained 6.6, 84.7 and 8.7% of the total treatment variance, respectively.

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Table 1. Agronomic descriptions of *BaHa-jidu*, *BaHa-gudo* and *Werer-962*.

Variety	Days to flowering	Days to maturity	Number of pegs plant ⁻¹	Number of mature pods plant ⁻¹	Hundred seed weight (g)	Shelling percentage
<i>BaHa-jidu</i>	33.5	125.9	29.2	14.8	50.0	70.0
<i>BaHa-gudo</i>	33.3	126.9	23.9	11.3	74.0	65.9
<i>Werer-962</i>	33.2	128.8	24.2	12.1	56.4	71.0

Table 2. Mean dry pod yield of groundnut varieties over six environments.

Variety	Mean dry pod yield (t ha ⁻¹)						Mean t ha ⁻¹	Dry pod yield advantage over <i>Werer-962</i> (%)	Seed oil contents (%)
	2007		2008		2009				
	Babile	Likale	Babile	Likale	Babile	Likale			
<i>BaHa-jidu</i>	2.08	2.38	2.49	2.08	2.51	0.59	2.02	19.53	53.6
<i>BaHa-gudo</i>	1.81	2.88	1.96	2.10	2.23	0.82	1.97	16.57	53.5
<i>Werer-962</i>	1.57	2.48	2.14	1.48	2.01	0.47	1.69	-	48.3

BaHa-jidu (2.02 t ha⁻¹) followed by *BaHa-gudo* (1.97 t ha⁻¹) were superior in mean dry pod yield over *Werer-962* (Table 2). *BaHa-jidu* (0.026) and *BaHa-gudo* (0.044) had also the smallest superiority measure values, which indicate best yield performance and dry pod stability.

6. Reaction to Major Diseases

Rust (*Puccinia arachidis*) and leaf spot (*Cercospora sp.*) are among the major groundnut diseases in eastern Ethiopia. On 1 to 5 diseases rating scale, *BaHa-jidu* scored 1.7 and 2.6 for rust and leaf spot, respectively. Similarly, *BaHa-gudo* scored 1.6 and 2.3 for rust and leaf spot, respectively. Accordingly, *BaHa-jidu* and *BaHa-gudo* were moderately resistant to rust and leaf spot diseases in the tested environments.

7. Quality Attributes

The seed oil contents of the *BaHa-jidu* and *BaHa-gudo* varieties were 53.6 and 53.5%, respectively. *Werer-962* relatively had lowest seed oil content (Table 2). *BaHa-gudo* is preferred for roasted grain (*kolo*) because of its large seed size, confectionery type.

8. Adaptation

BaHa-jidu and *BaHa-gudo* are recommended for production in eastern Ethiopia in the range of 1400 to 1650 meters above sea level.

9. Conclusion

The groundnut varieties *BaHa-jidu* and *BaHa-gudo* gave 2.02 and 1.97 t ha⁻¹ of dry pod yield, respectively. Both

varieties expressed stable performances across environments and were recommended for production area of 1400 to 1650 meters above sea level. The breeder and pre-basic seeds of both varieties (*BaHa-jidu* and *BaHa-gudo*) are maintained by Oilseed Crops Research Program of the Haramaya University.

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