

Registration of *Obsa* and *Dicho* Sesame (*Sesamum indicum* L.) Varieties

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Abstract: *Obsa* and *Dicho* are the names assigned after release for sesame (*Sesamum indicum* L.) varieties with accession number Acc. EW004 and Acc. EW015, respectively. Both varieties were by far greater than the standard check, *Abasena*, in terms of grain yield (by 142.06 and 135.98%, respectively), disease resistance, tolerant to shattering and non-lodging. The average oil contents and average oil yields for *Obsa* and *Dicho* were 51.45 and 53.8%, and 498.4 and 503.9 kg ha⁻¹, respectively.

Keywords: *Dicho*; *Obsa*; *Sesamum indicum*; Variety Registration

1. Introduction

Sesame (*Sesamum indicum* L.) has early origins in East Africa and in India. Except for one, which is found in India, all the other 19 wild species of sesame are found in Africa. This suggests that sesame was domesticated in Africa, probably in Ethiopia (Onwueme and Sinha, 1991). The world production of sesame seeds gradually increased from 1.5 million tons per year in the 1960s to 3.2 million tons per year in 2005 due to an increased demand for sesame oil worldwide. Over this period, annual international trade in sesame seed increased from 150,000 tons to 800,000 tons. Africa produced an estimated 25% of the total world production and contributed nearly 40% of the world exports. Among African countries, Nigeria were the leading producer (75,000 tons year⁻¹), followed by Ethiopia (50,000 tons year⁻¹), Tanzania (41,000 tons year⁻¹) and Chad (35,000 tons year⁻¹) (Wijnands *et al.*, 2007).

In Ethiopia, the total area, production and productivity averaged for the last 11 years were 0.1 million ha, 70, 000 tons and 0.60 t ha⁻¹, respectively (CSA 1996/1997–2007/2008 as cited in Negash *et al.*, 2011). Sesame ranks first in total production from oil crops. Tigray, Oromia, Amhara and Benshangul Gumuz are the major producers in Ethiopia. The last 11 years data showed that the production of sesame is increasing in terms of area and total production while the productivity is much below 1.0 t ha⁻¹.

The major sesame producing regions in Ethiopia are situated in the low land of northwest and southwest (Wijnands *et al.*, 2007). The author indicated that northwestern regions have comparatively the highest yield per hectare. Of the total 707059 hectare land allocated for oil crop production in Ethiopia during 2007/2008 main cropping season, 185912 hectare (26.294%) was mainly covered by sesame with the national average productivity 1.0 tone per hectare, and it accounts for 70% of the export value of all oil crops. During the same season, 25.66% sesame production came from Oromia, mainly from East Wollega and West Wollega (60.45% and 12.54% of the total production in Oromia, respectively). However, the regional productivity per hectare was less than the

national average, 0.62 t ha⁻¹ (CSA 2008). The major problems of sesame production in western region were lack of adaptable high yielding and disease resistant varieties. Cognizant of this problem, Bako Agricultural Research center has started sesame improvement activities before decades and released two promising sesame varieties named *Obsa* and *Dicho* through national variety release system in 2010. Therefore, this paper highlights the agro-ecological adaptation, grain yield performance, disease reaction and other agronomic and management recommendation for the released varieties for further uses by producers, researchers and industries

2. Variety Evaluation

Adaptation trial of released sesame varieties were conducted at Bako, Gutin, Wama, Uke, Boneya and Dedessa from 2003-2004. But, none of them were adapted and only *Abasena* gave grain yield of about 300 kg ha⁻¹ (Dagnachew, 2011). Cognizant of the fact that all released varieties performed poorly in western region, introduction and evaluation of sesame landraces were initiated in 2005/2006 on 117 sesame landraces collected from different regions. Through the routine variety trial procedures, 19 best performing genotypes were evaluated with one standard check, *Abasena*, and were promoted to multi-location variety trial in 2007 and 2009 at Dedessa and from 2008–2009 at Bako and Gutin. All genotypes performed and gave grain yield better than the standard check. Among the tested genotypes, Acc. EW004 (*Obsa*) and Acc. EW015 (*Dicho*) were found resistant to bacterial blight, showed consistent performance across location and gave an average grain yield of 1068.5 kg ha⁻¹ and 1062.6 kg ha⁻¹ at on-station and 868.8 and 810.6 kg ha⁻¹ on farmers field, respectively. These better performing varieties were evaluated by national variety release committee, preferred by farmers across location and finally released in 2010.

3. Agronomic and Morphological Characters

Obsa (Acc. EW004) is a white seeded variety with ovoid seed shape and medium seed size (1000 grain weight of 2.56 gram). It has purple colored narrow leaf and medium plant height with comparatively short length of the first capsule bearing zone from the surface on the main stem. *Dicho* (Acc. EW015) has white-tan seed color with ovoid shape and better seed size (1000 grain weight of 2.72 gram). Thousand grain weights for the standard check, *Abasena* is 2.58 gram. Summary of major agronomic and morphological traits of both varieties (*Obsa* and *Dicho*) are presented in Table 1.

4. Yield Performance

Obsa (Acc. EW004) and *Dicho* (Acc. EW015) were local landraces collected from western region of Ethiopia by IBC (Institute of Biodiversity Conservation) decades ago. The varieties were evaluated against the standard check, *Abasena*, from 2005 to 2009 in different breeding stages at different sites. Across years and locations, both varieties were by far high yielders than the standard check. On the research field, the average grain yield for *Obsa*, *Dicho* and *Abasena* were 1068.5, 1062.6 and 399.4 kg ha⁻¹, respectively. On the farmers' field, they gave 868.8, 810.6 and 324.57 kg ha⁻¹, respectively. Though it was reported as more than 60% of sesame production in Oromia comes from Wollega zones (CSA, 2008), the average productivity per hectare of sesame has been less than 500 kg across years mainly due to lack of improved variety and disease problem. Thus, the release of these varieties can minimize the problem and boost productivity of the crop.

5. Disease Reaction

In western Oromia, particularly in eastern and western Wollega zones of sesame producing districts, its production and productivity were highly hampered by bacterial blight. However, *Obsa* and *Dicho* were resistant to moderately resistant to major diseases of sesame such as bacterial blight over locations and years.

6. Grain Yield Stability

Stability analysis in 20 sesame genotypes planted across three locations for two years following the method of Eberhart and Russel (1966) indicated that both *Obsa* and *Dicho* were moderately stable with higher mean grain yield than the remaining genotypes. Several authors indicated that the best agro-ecology for sesame adaptation and wider genetic diversity is at altitude below 1500 masl (Gemechu and Bulcha, 1992; MARD, 2008; Demissie *et al.*, 1992). Contrary to the expectation and these findings, maximum grain yield was obtained and best field performance was observed for these varieties at Bako, where the altitude is around 1600 masl than at Gutin where the altitude is 1350 masl across years.

7. Conclusion

Obsa and *Dicho* are adaptable, high yielding and disease resistant varieties with desirable agronomic traits released for western Oromia where none of the former released sesame varieties performed well. Beside the yielding ability of these varieties, their oil content is more than 50%. Therefore, the release of these varieties can have an immense effect for sesame production in western region in particular, and the country in general.

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9. References

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Table 1. Adaptation, agronomic and morphological characteristics of sesame varieties, *Obsa* and *Dicho*.

| Characteristics | <i>Obsa</i> (EW004) | <i>Dicho</i> (EW015) |
|---|--|--|
| Adaptation, agronomic and morphological characteristics | Bako, Dedessa, Gutin and areas with similar agro-ecology | Bako, Dedessa, Gutin and areas with similar agro-ecology |
| Adaptation area: | | |
| Altitude (masl) | 1250-1650 | 1250-1650 |
| Rainfall (mm) | 700-1100 | 700-1100 |
| Fertilizer rate: | | |
| DAP (kg ha ⁻¹) | 0 | 0 |
| Urea (kg ha ⁻¹) | 50 | 50 |
| Seed rate (kg ha ⁻¹) | 5 | 5 |
| Spacing (inter x intra row) | 40 cm x 5 cm | 40 cm x 5 cm |
| Planting date | Mid to late June | Mid to late June |
| Days to flowering | 62-75 | 65-78 |
| Days to maturity | 120-137 | 131-142 |
| Plant height (cm) | 86-115 | 91-122 |
| 1000 seed weight (g) | 2.56 | 2.72 |
| Seed color | white | white-tan |
| Crop pest reaction | resistant to major diseases and pests | resistant to major diseases and pests |
| Average oil content (%) | 51.45 | 53.80 |
| Average oil yield (kg ha ⁻¹) | 498.4 | 503.9 |
| Yield (kg ha ⁻¹): | | |
| Research field | 1068.5 | 1062.6 |
| Farmers field | 868.8 | 810.6 |
| Year of release | 2010 | 2010 |