**Screening of Soybean (*Glycine max* L.) Advanced Lines under**

**Organic Management in Turkey**

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Summary: The breeding research of soybean (*Glycine max* L.) began with advanced lines of “Soybean Breeding Project” supported by MFAL-GDAR in 2013 under organic management for comparing grain legume crops of organic breeding programme of COBRA (Coordinating Organic Plant Breeding Activities for Diversity) project because of priority for this species to be produced organically in Turkey for organic sector at Organic Open Field Experimental Area of AARI located in the Mediterranean Region. Main objective of the research is screening the advanced lines of soybean genotypes under organic management to determine appropriate, adapted and stable line/s of breeding programme. For this purpose, trials of 6 advanced lines of second crop soybean genotypes were set up successive two years in 2013 and 2014 during summer season. The trials of 6 soybean lines and 2 registered varieties in year 1 and 2 showed that many lines in terms of grain yield and some of yield components such as 100-seed weight, number of pod per plant, plant height, and number of days to flowering, number of lateral branch were significantly different and superior to standard registered varieties of AARI which have been produced in different parts of Turkey mainly in Aegean and South East Anatolia Regions. Additionally, min. and max. seed protein contents of soybean lines ranged as 31.8-41.2% in 2013 and 32.9-43.1% in 2014, respectively. Protein contents were found remarkable in terms of advanced lines especially for three genotypes which were showed higher contents than registered varieties although data was not determined significantly different, statistically. It is found that there is strong possibility and encouraging results to obtain high yielding and quality soybean varieties suitable for organic farming.

**Introduction:** Organic farming (O) requires varieties which are especially adapted to low input cropping system. As a consequence, researchers breeding approach to develop region-specific genotypes of soybean for organic conditions. O has been increasingly attaining interest in world wide. Turkey is one of the ten countries with the most organic producers in 2013 in the world. O area of Turkey occupied 1.9 % of the total agricultural area in 2013. For comparison, the share of O area in total agricultural area was 3.9% in France, 6.5% in Spain and 10.3% in Italy in 2013 (Anonymous, 2015). Turkey has O law (25659/3.12.2004) and legislations (27676/18.8.2010) modified in 2013 and they refrains from using agrochemical inputs. Major crops of organic products are dried fig, apricot and grape but number of crops reached 208 in 2013 whereas it was 150 in 2002. In Turkey 7 Soybean registered varieties have been using for production and the research is the first evaluation some of varieties lines for O. Turkey import considerable amount of soybean and soybean products for both conventional (C) and O sectors. Turkey’s production of C and O soybean were 180 000 and 691 ton in 2013, respectively. It is well known that the use of modern cultivars in the organic context does not imply that these are the best cultivars for the O system. Main objective of the research is to develop soybean varieties adapted to Aegean Region which are competitive, high-yielding, herbicide and nematode tolerant, and low input usage, from advanced lines of AARI for O practices which were performed high yield and quality under trials of conventional management last year’s to increase soybean production in Turkey.

**Materials and Methods:** The research was carried out with 6 advanced lines and 2 registered varieties (Cinsoy and Umut2002) of AARI in Randomized Block Design with 3 replicates, 4 rows, 5 m row length, 20 plant/m2 densities (45x5 cm) for two successive years (2013 and 2014) as second crop at Organic Experimental Area of AARI located in the Aegean Region of Turkey. The characters examined were grain yield (kg/ha), 100 grain weight (g), Plant height (cm), Pod number per plant, branch number, number of days to flowering and seed protein content (%).UPOV and Bioversity International descriptors used for observations. UPOV and Bioversity International descriptors used for observations. Seed protein content was determined by Dumas combustion method using RapidN Cube and conversion factor was 6.25. Statistical data analysis was performed by JMP 7 (SAS, 1997).

**Results and Discussion:** The soybean breeding program of AARI selects high-yielding varieties through extensive testing in various locations in Turkey in order to release premium soybean varieties to benefit of soybean growers. This is achieved by establishing hundreds of populations with diverse genetic background and screening hundreds of distinct breeding lines. 100-seed weight (g) (17,5-21), number of pod per plant (56-87), plant height (96-140 cm), and number of days to flowering (27-33), number of lateral branch (1-7) were significantly different and superior to standard registered varieties of AARI (Cinsoy and Umut2002) which have been producing in different parts of Turkey mainly in Aegean and South East Anatolia Regions, however yield capacity of Cinsoy and Umut2002 are high under C (2500-4500 and 2500-3300 kg/ha, respectively) and protein contents approximately 35-40% depending on environment and genotype. Both are important for both feed and food utilization of soybean, so; seeds from all entries of trials are routinely tested for seed protein content. Totally high level results obtained for samples and mean values determined between 35.2-40.9%. The highest seed protein content was found for ETA3 while it showed the lowest grain yield for both years. Vollmann *et al.* (2000) reported negative correlation between soybean yield and seed protein content like many others. Grain yields were obtained between 2573-3849 and 1677-4116 kg/ha in 2013 and 2014, respectively. In 2013 the highest yield belonged to 68 (3849 kg/ha), in 2014 69 gave the highest yield (4116 kg/ha)(Figure 1, 2). Concerning with grain yield, yield components, and seed protein contents 68 and 69 gave promising results as evaluated totally. As a result, it is clear that at the end of the research new soybean varieties will be gained organic sector and usage of farmers producing traditionally.

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