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MIBO 1: A SHORT DURATION BIG ONION (*ALLIUM CEPA* L.) VARIETY FOR THE DRY ZONE OF SRI LANKA *

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INTRODUCTION

Common onion (big onion) is one of the main cash crops grown in the Dry Zone of Sri Lanka. In 2013, cultivated extent and production of big onion were 4,223 ha and 69,638 mt (AgStat, 2014), respectively and the production was only 29% of the annual requirement. Therefore, 168,874 mt of big onion had to be imported to meet the national demand. Current average yield of big onion in Sri Lanka is about 16.5 t/ha (AgStat, 2014). Dambulla selection is the only recommended big onion variety in Sri Lanka. It requires about 90 days from transplanting to harvesting. As the dry period in the Dry zone is limited to about 4 months in commonly cultivated areas of Sri Lanka (Punyawardena, 2004), it is important to develop short duration onion varieties to match with the prevailing weather conditions.

Moreover, as big onion is threatened with severe pest and disease infestations, resistance for those biotic stresses should also an important breeding objective of the crop. Similarly, big onion is a highly seasonal crop resulting a market glut during harvesting period; mid August to early October. Therefore, varieties with longer shelf life should be developed enabling a portion of the production during *Yala* season to be stored and periodically supplied to the market. Therefore, the objective of this study was to develop high yielding (35 t/ha), short-duration (75 DATP) big onion varieties with longer shelf-life and resistance or tolerance to biotic stresses.

* *See "Tropical Agriculturist" Volume 163 for details.*

MATERIAL AND METHODS

Eleven improved big onion lines during *Yala* 2011 and 9 improved lines in *Yala* 2012 were evaluated along with Dambulla selection for bulb yield and maturity duration at the Field Crops Research and Development Institute (FCRDI), Mahailluppallama. Five-week old seedlings were transplanted in to 3 m x 1 m plot which included 224 seedlings per plot. Days to maturity was recorded at physiological maturity stage. Matured bulbs were harvested, cured in shade and dried leaves were removed and measured the yield. Based on the results, two onion lines; MIBO 09 E2 and MIBO 10-03 were selected for adaptability testing in both farmers field and research field conditions along with Dambulla selection as the standard check. National Coordinated Varietal Trials (NCVT) were conducted at the FCRDI, Grain Legume Oil Crops Research and Development Centre (GLORDC), Angunakolapelessa, Regional Agriculture Research and Development Centre (RARDC), Aralaganwila and Agriculture Research Station (ARS), Thinnaweli during *Yala* 2013 and 2014 seasons. Variance component method proposed by Abeysiriwardhana *et al.* (1991) was followed to analyze genotype x environment interaction.

Varietal Adaptability Trials (VAT) were conducted in six farmer fields at Mahaweli system H. Galenbindunuwewa, Galewela, Galnewa, Dambulla and Kimbissa during *Yala* 2013 and Dambulla, Ganthiriyagama, Galewela, Kimbissa, Galenbindunuwewa and Mahailluppallama in *Yala* 2014. The method proposed by Abeysiriwardhana (2001) was followed to identify the most adaptable and stable line across diverse environments. Big onion lines were also evaluated for storability with standard variety Dambulla selection under ambient conditions in the store house at the FCRDI from mid September 2012 to mid April 2013. Initial weight of the bulbs introduced to storage racks was 5 kg. Storability was tested after two and seven months storage. Onion lines were tested along with Dambulla Selection for major pests under insecticide-free conditions.

RESULTS AND DISCUSSION

Bulb yield was significantly different among big onion lines in *Yala* 2011, however bulb yield among lines were not different in *Yala* 2012. MIBO 10-03 produced the highest yield in *Yala* 2011 while the MIBO 09 E2 produced similar yield to Dambulla selection. However, MIBO 09 E2 reached its physiological

maturity stage within 76-80 days which was 11-12 days earlier to Dambulla selection in both seasons. Based on high yield and early maturity, MIBO 09 E2 and MIBO 10-03 were selected for adaptability testing. In the NCVT programme, MIBO 09 E2 recorded the highest mean yield of 26.2 t/ha in *Yala* 2013 and a similar yield (33.4 t/ha) to Dambulla selection (29.5 t/ha) in *Yala* 2014. MIBO 09 E2 was the most adaptable line as it showed positive mean deviations in both seasons with non significant stability parameter in *Yala* 2014.

In VAT, mean yields of MIBO 09 E2 (37 t/ha and 38.7 t/ha in *Yala* 2013 and *Yala* 2014 respectively) was significantly higher than that of Dambulla selection (30.8 t/ha and 34 t/ha in *Yala* 2013 and *Yala* 2014 respectively). MIBO 09 E2 was the most adaptable and stable line under farmer management as it showed positive mean deviations with non significant stability parameter in both seasons. Storability at 2 months and 7 months after storage which coincide with the time of vernalization in Maha and *Yala* were significantly different among big onion lines. Storability of MIBO 09 E2 was higher than that of Dambulla selection whereas the storability of other tested lines were similar or lower than Dambulla selection at 2 and 7 months after storage. All the lines/ varieties tested were damaged by thrips. However, MIBO 09 E2 showed a lower severity to thrips damage compared to Dambulla selection. Onion caterpillar damage was not observed during *Yala* 2012. Farmers who conducted large plot on-farm demonstrations in *Yala* 2014 confirmed this observation.

Based on these results, it can be concluded that MIBO 09 E2 performed well in both research and farmer field conditions. It produced 38.7 t/ha of average bulb yield under farmer management. As this line matured within 76 days after transplanting, which was 11-12 days earlier to Dambulla selection, it is well fitted for prevailing climatic conditions in the Dry zone of Sri Lanka. Comparatively longer shelf life of MIBO 09 E2 enables the storage of excess onion production during harvesting period to reduce the market glut. Low susceptibility of thrips damage of this promising line reduces the usage of insecticides, thereby reducing the cost of production, producing safer onion for consumption and protecting the environment. MIBO 09 E2 was conditionally released as new big onion variety "MIBO 1" in 2014 at the Varietal Releasing Committee Meeting of the Department of Agriculture, Sri Lanka and recommended to cultivate in all onion growing areas in Sri Lanka.

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