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Evaluation of Kenaf Breeding Lines in Heavy Moisture Condition of Paddy Rice Field

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[Introduction]

In Korea, global warming caused by CO₂ and excess production of rice socially have been a big issue. We should take a number of measures to alleviate both matters. Of plants, kenaf(*Hibiscus cannabinus* L. 2n=36) is an annual herbaceous crop of the Malvaceae family, which is known for its economic importance. Biological yield of kenaf is about 3-4 times that of forest and CO₂ assimilation capacity is about 4-5 times that of trees. Also, it contains aerenchyma in adventitious roots that helps kenaf grow in submergence condition such as paddy field. Therefore, this study was conducted to select elite lines with submergence tolerance through outbreeding and mutation.

[Materials and Methods]

The parental two materials used in this study is Jangdae and Hongma 300 variety. F₃S lines were taken by crossing Jangdae with Hongma 300. M₅S lines were mutated by 300Gy of gamma-ray. Seeds of 2 parents, 50 F₃S and 10 M₅S were raised on a paddy field from June to October in 2020. The flooding periods were 3 months from June 15th to September 15th. All lines were used to record data on days to 1st flowering, plant height, stem diameter and branch number. The record data was average of 10 repetitions.

[Results and Discussions]

These days, a concern for kenaf has been increased due to a high biomass. So, the study was conducted to select the elite lines with submergence tolerance through outbreeding and mutation. Analysis of variance at the end of the experimental period revealed that there was difference ($P<0.05$). The plant height of the No. 164 was 157.1 cm on average that was higher than that of two Control, Jangdae(77.6 cm) and Hongma 300 (89.6). There was a big difference in diameter of 15 cm above soil surface. The two parents showed 7.3 (the former) and 9.7 mm (the latter), respectively. However, the No. 164 was high with 12.5 mm on average. Of the No. 164, the highest score was obtained by No. 164-3 with 15.3 mm that is considered to be transgressive segregation. A blooming of the first flower at the Jangdae was August 10th and there was no flowering at the Hongma 300. No. 164 showed the first blooming on September 1th. The branch number of all lines was similar with just one. As to mutation line named No. 994, there was difference ($P<0.05$) for plant height and stem diameter. Its plant height with 145.9 cm on average were superior to the two parents. Findings showed the mean stem diameter of this line (13.4 mm) was higher than that of two parents. Of 10 lines of the No. 994, the highest score was taken by No. 994-2 with 15.6 mm. The first flowering on Aug. 31 of this line showed a significant difference compared to two parents. Same result was taken on the branch number with the No. 164. Put previous findings together, the two lines (164 and 994) would be excellent germplasms for a flooding condition such as paddy field.

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