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Evaluation of Promising Population for Breeding High Lignan and Non-Shattering Sesame

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[Introduction]

Since sesame cultivation is highly dependent on human resources, it is difficult to supply and demand stably. So, the production and cultivation area of domestic sesame have been decreasing recently. Currently, most of the sesame consumption depends on imported products such as China and India, and there is no significant difference in quality from domestic sesame, so it is necessary to differentiate it from imported sesame seeds. Lignan is a representative antioxidant contained in sesame seeds and is known for various effects such as anticancer and anti-inflammatory. It is also important to develop shattering tolerance varieties that can be harvested by machine to reduce labor. Therefore, this study bred promising population to develop high lignan and shattering tolerance varieties, and evaluated the lignan content and shattering tolerance of each lines.

[Materials and Methods]

Geonbeak/YCS1809 (GXY), Miryang61/MSL16038-4B-30-1 (M61XMSL16038) and Miryang61/Miryang73 (M61XM73) were crossed in 2019. Geonbeak and Miryang61 have phytophthora blight resistance and high yield, YCS1809 and MSL16038-4B-30-1 are genetic resources with high lignan, and Miryang73 has a high lignan content and strong shattering tolerance. For the next two years, the generation progressed to F4 in the greenhouse, and the F5 generation was planted in the field. The lignan content of the F6 generation seeds was than analyzed by HPLC for 721 lines in the GXY, 343 lines in the M61XMSL16038, and 478 lines in the M61XM73. In addition, the high-lignan lines of M61XM73 were genotyped through KASP marker that could identify shattering tolerance.

[Results and Discussion]

As a result of the lignan analysis of GXY, M61XMSL16038, and M61XM73, the lignan content ranges were 1.2-14.2 mg/g, 4.6-17.3 mg/g, and 3.6-17.9 mg/g and the average were 7.3±2.26 mg/g, 9.9±2.49 mg/g, and 9.5±2.64 mg/g, respectively. All three cross combinations showed a normal distribution. For the cultivation of high lignan varieties, lines with a lignan content of 12.0mg/g or more were selected. So, 17 lines of GXY, 72 lines of M61/MSL16038, and 85 lines of M61XM73 were selected. In addition, as a result of analysis using the KASP marker that can determine shattering tolerance for 85 high lignan lines selected from M61XM73, 41 lines were evaluated as shattering tolerance. The selected lines with high lignan and shattering tolerance will be planted in the field in 2022 to evaluate disease resistance and yield.

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