PB-08

Correlation Between Generations as Cultivation Twice a Year in Potato Breeding

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[Introduction]

General potato breeding be taken about 10 to 11 years to evaluated one generation per year. But double cropping breeding is short than general potato breeding, because evaluation and selection of early generation can be performed twice a year. The growing conditions of double cropping such as temperature and day length are drastically different between spring and autumn. Using this situation, good clone with high adaptability is selected. The aim of this study is to accelerate early generation and select clones with adaptability in general potato breeding.

[Materials and Methods]

We evaluated 22 clones obtained by three crosses (D01, H01, M02). To accelerating generation, clones were cultivated with first clone generation and Second clone generation in Spring and Autumn 2017. Third clone generation(C3) and preliminary yield trial(Y) were conducted from Spring and Autumn 2018. Replicated yield trial(B) was conducted in Spring 2019. Clones in first and second clone generation were evaluated by visual. After second clone generation, clones were harvested individually and evaluated for tuber yield, tuber specific gravity and percentage of physiological disorders (growth crack, hallow heart, internal browning).

[Results and Discussion]

The field conditions with lowering temperature and short cultivation period during the Y contributed to reducing yield of total tubers and marketable tubers. In the yield of total tuber, correlations between two immediate generations (C3 vs Y, Y vs B) were low. Correlation between C3 and B was significant but was low ($r=0.28$). In marketable yield, correlation between two immediate generations (C3 vs Y, Y vs B) were low($r=0.21,0.26$). In correlation about specific gravity, between C3 and Y, C3 and B was high. In physiological disorder, correlation of growth crack between two immediate generations (C3 vs Y, Y vs B) were significant ($p<0.05$). correlation about hollow heart and internal browning between Y and B were high and significant($p<0.05$). These result mean that it was not efficient to select characteristic of yield and specific gravity in autumn. It was efficient to select about physiological disorders.

[Acknowledgement]

본 연구는 국립식량과학원 작물시험연구 사업(사업번호 PJ012540022019)의 지원에 의해 이루어진 결과로 이에 감사드립니다.

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