開発と研究

サツマイモ栽培への品質工学の適用

Application of Quality Robust Engineering for Sweet-potato Cultivation

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A second experiment in the application of quality engineering to sweet-potato cultivation was carried out. The first experiment took two years: an L_{18} orthogonal array experiment was carried out in the first year and then a confirmatory experiment was carried out in the following year. In the second experiment, the confirmatory experiment was carried out under conditions prepared in advance so that the orthogonal array experiment and the confirmatory experiment could be carried out simultaneously, which enabled the whole experiment to be finished within one year. The sweet potatoes were evaluated by analysis of variance; calculations were performed to determine interaction effects among months of cultivation, the size of the harvested potatoes, and relevant control factors and noise factors. As a result, it was found that months of cultivation and potato size are closely related. Relationships between months of cultivation and potato size were derived for each control factor level, enabling cultivation conditions to be selected for harvesting sweet potatoes of any desired size.

Key words : robust quality engineering, Taguchi methods, parameter design, S/N ratio, experimental farm, cooperation industries

1. はじめに

実験計画法はイギリスの統計学者Ronald Aylmer Fisherが農場実験の精度を上げるために創始したもの[1]であり，それを元にタグチメソッドと呼ばれる品質工学の基礎が築かれた[2]。元が農業実験からスタートしているのだが，品質工学において農業に適用した事例は数例[3)~5)]程度である。

広島地区で開催している物づくりの機能性評価研究会では，品質工学の農業分野への適用事例を広げ，それによる新たな知見を得るために，サツマイモを対象にパラメータ設計を適用した実験を行った。

第1回目の実験は2007～2008年にかけて行った[6]。今回はそれらの反省を踏まえて実験を行ったのでその概要を記す。

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