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小区播种机电控系统设计及试验

Design and experiment on electronic control system for plot seeder

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英文关键词: [seed](#) [control systems](#) [design](#) [metering device](#) [distributor](#)

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中文摘要:

为了提高小区播种机的工作精度和工作效率,研制了小区播种机电控系统,既可保证育种试验的准确性和科学性,也有利于降低试验成本和提高作物育种试验的效率。针对锥体格盘式排种机构,使用步进电机精确控制格盘排种器的旋转角度,采用直流电机对离心式分配器进行控制。应用双传感器对比检测方法,减少因地轮打滑所引起的排种器播种长度不准确的问题。通过室内台架试验表明,格盘排种器旋转角度控制系统,能确保在不同的转速下排种格盘旋转一周的角度误差均小于0.24%;播种不同种子时最佳分配器转速分别为油菜种子1 560 r/min;白菜种子1 020 r/min;芝麻种子1 560 r/min;绿豆种子780~1 020 r/min,在此分配器转速下工作,行间一致性变异系数最小,行间一致性最好;机具行走速度在2.5 km/h以上时,行内一致性变异系数在15.4%以下。机具行走速度越低,行内一致性变异系数越大。

英文摘要:

In order to improve the precision and efficiency of plot seeders, an electronic control system was developed, which could increase the accuracy and scientificity, decrease cost of breeding experiment in the field. A stepping motor was applied to control the rotation angle of cone compartment tray of the metering device. The centrifuging distributor was controlled by a direct-current motor, and two speed sensors were used for monitoring working speed to reduce the influence of skidding which caused inaccuracy of seeding length. The indoor experiment results showed that the inaccuracy for the rotation angle of cone compartment tray was less than 0.24% at all kinds of rotating speed; according to different seeds, the best distributor rotating speed was different. The speed respectively was 1?560 r/min for colza seeds, 1?020 r/min for Chinese cabbage seeds, 1?560 r/min for sesame seeds, 780-1?020 r/min for green bean seeds. Seeding in such speed could make sure that the coefficient of variation between rows was minimal and the best coefficient in rows was achieved. When the working speed was higher than 2.5 km/h, the coefficient of variation in the same rows was less than 15.4%. When the working speed was lower, the coefficient of variation in the same rows was higher.

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