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瓜类嫁接苗生物力学特性的试验分析

**Experimental analysis on biomechanical properties of cucurbits**

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中文摘要:

为给瓜类蔬菜斜插自动嫁接机器人的研制提供设计依据和有关设计参数, 该文采用自制植物茎力学性能测试装置, 选取瓜类常用嫁接作物为研究对象, 对不同瓜类嫁接作物的形态指标、抗拉特性、压缩特性及压杆稳定特性进行了试验研究。试验结果得出在不损伤作物茎前提下, 在夹持部位粘贴弹性EVA(乙烯-醋酸乙烯共聚树脂)软质垫片可以获得稳固的夹持效果, 最大抗拉力2.38 N; 在常用嫁接砧木中, 黑籽南瓜的横向压缩屈服极限力最大为7.288 N, 瓠瓜的屈服极限力最小为3.474 N; 在常用嫁接砧木品种中黑籽南瓜的失稳临界载荷最大为1.49 N。并利用StatView软件对生物形态指标与生物力学性质进行了相关性分析, 结果表明不同作物力学性能指标与长轴直径相关性较大。该文为设计开发新型自动嫁接装置提供依据。

英文摘要:

In order to provide a reference and parameters for designing the hole-oblique insertion hypocotyl grafting robot of cucurbit vegetables, the biomechanical properties test beds had been developed and it they were used to do the biomechanical properties experiments on cucurbitaceous crops, whose research object was common cucurbits in grafting. The morphological characteristics and biomechanical properties (such as tension resistance, compression, column stability) were measured at hypocotyl of cucurbits. The experimental results showed that it could chuck the hypocotyl more quickly and effectively with the gripper which was pasted with EVA soft elastic, and the highest tension resistance of seedling stem was 2.38 N without damaging seeding stem; the largest yield limit pressure of transverse compression was Cucurbita ficifolia and its value was 7.288 N in the seeds of common rootstocks, the smallest of yield limit pressure was figleaf gourd and its value was 3.474 N, the critical instability loads of the column with Cucurbita ficifolia was the largest and its values was 1.49N. The correlation analysis of biomechanical properties and morphological characteristics was conducted by StatView software, and the results indicated that the long axis diameter of cucurbits had a higher correlation with biomechanical properties. It can propose a foundation for designing automatic grafting robot.

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