

黄瓜幼苗自发声频率测定方法与试验 Method and Experiment of Spontaneous Acoustic Frequency Measurement on Cucumber

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摘要: 声波处理技术对于设施园艺中植物的生长具有促进作用,但其促进机理不明确,为此以黄瓜为研究对象,对植物自发声频率的测定方法进行了研究,并研究了黄瓜幼苗期的自发声频谱特性。在半消音室内,采用PDV-100激光测振仪,以非接触测量的方式,对黄瓜幼苗不同部位(主脉、叶肉和茎)在不同环境应激条件下(增大光照强度和干旱胁迫)的自发声特性进行监测。对自发声信号进行自相关运算和功率谱分析,获得了黄瓜幼苗的自发声频谱特征。结果表明,黄瓜幼苗自发声的主频为 $4.98\sim 5.86$  Hz;3个部位的自发声信号在环境刺激条件下的变化规律基本一致。 Acoustic frequency technology can promote the growth of plants in horticulture, but the promotion mechanism is not clear. Therefore, the method of spontaneous acoustic frequency (SAF) measurement was explored, and the spontaneous spectrum of cucumber seedlings was examined. Using a laser PDV-100 vibrometer, the SAF of cucumber seedlings in different locations (main vein, mesophyll and stem) and different environments (light intensity changes and drought stress) was measured in a semi-anechoic room by non-contact measurement. The power spectrum and autocorrelation of SAF were analyzed and the spontaneous spectral characteristics of cucumber seedlings were obtained. The results showed that the basic frequency of cucumber seedlings' SAF was in  $4.98\sim 5.86$  Hz and the spontaneous acoustic signal variations under different environments in the three parts of the cucumber were consistent.

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