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高粱抗蚜研究进展

刘国庆*, 杜瑞恒, 侯升林, 吕芃, 籍贵苏, 李素英*

河北省农林科学院谷子研究所, 石家庄 050035

Resistance to Aphids in Sorghum: a Review

Guoqing Liu*, Ruiheng Du, Shenglin Hou, Peng Lü, Guisu Ji, Suying Li*

Institute of Millet Crops, Hebei Academy of Agricultural and Forestry Sciences, Shijiazhuang 050035, China

摘要 高粱(*Sorghum bicolour*)是世界上最重要的粮食、饲料、酿造和能源作物之一, 也是C_4植物研究的模式植物。蚜虫是农业生产上的重要害虫, 几乎危害所有的栽培作物。危害高粱的蚜虫主要包括高粱蚜(*Melanaphis sacchari*)、麦二叉蚜(*Schizaphis graminum*)和玉米蚜(*Rhopalosiphum maidis*)。高粱的抗蚜资源尚不丰富且缺乏深入系统的研究。目前研究较多的是麦二叉蚜的抗性遗传方面, 已定位20个抗性QTLs, 单一QTL对抗性差异贡献率最高可达80.3%, 对高粱蚜和玉米蚜的研究尚需进一步加强。高粱的理化特性与其抗蚜性能相关, 故可与育种实践相结合。高粱和蚜虫(*Acyrthosiphon pisum*)的全基因组测序工作已经完成, 这将有助于蚜虫-植物间的相互作用关系及植物对蚜虫的抗性机制研究。目前已克隆到2个抗蚜基因, 且多个抗蚜基因(位点)已被定位在染色体上。该文重点综述了上述研究成果并对高粱抗蚜的研究前景进行了展望。

关键词: 蚜虫 基因 抗性遗传 高粱

Abstract: *Sorghum bicolor* is one of the most important crops in the world, used for food, fodder, alcoholic beverages, as well as biofuel production, and also serves as a C_4 model plant. Aphids are major agricultural pests injuring nearly all cultivated crops. Sorghum aphid (*Melanaphis sacchari*), greenbug (*Schizaphis graminum*) and corn leaf aphid (*Rhopalosiphum maidis*) are the major aphid species damaging sorghum growth. We lack sorghum aphid-resistance germplasm and systematic study. Some progress has been made in sorghum greenbug resistance research. Recently 20 resistant quantitative trait loci (QTL) were mapped, and the maximum resistant phenotypic variation explained by a single QTL reached 80.3%, but little is known about the resistance to sorghum aphid and corn leaf aphid. The morphological characters and chemical contents of sorghum could affect aphid resistance. Such resistance-related traits may be useful for breeding. The published sorghum and pea aphid (*Acyrthosiphon pisum*) genome sequences could help in better understanding the aphid-plant interaction and plant aphid-resistance mechanism. Two aphid-resistance genes have been cloned, but more genes and QTLs are needed. Here, we review recent studies of sorghum aphid resistance and propose possible future research.

Keywords: aphid gene resistance inheritance sorghum

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Corresponding Authors: 刘国庆 Email: guoqingliu@hotmail.com

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