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拌种吡虫啉残留对麦长管蚜实验种群的影响

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Impact of imidacloprid residue after seed dressing on laboratory populations of Sitobion avenae (Hemiptera: Aphididae)

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摘要 为探明吡虫啉拌种后在下一代小麦籽粒中的吡虫啉残留对麦长管蚜*Sitobion avenae* (Fabricius)实验种群的影响， 用60%吡虫啉悬浮种衣剂与小麦籽粒按照2， 4， 6和8 g/kg的比例进行处理， 在室内条件下采用超高效液相色谱-串联四级杆液质联用法对收获后的小麦籽粒进行残留分析； 并通过室内生命表方法， 研究麦长管蚜取食上述剂量吡虫啉拌种处理收获后的小麦籽粒所长幼苗后的各项生命参数。结果表明： 收获的小麦籽粒中吡虫啉残留量随拌种剂量的增加而增加， 以8 g/kg处理后收获的籽粒中残留量最高， 为0.0290 mg/kg。随着吡虫啉残留量的增加， 麦长管蚜发育历期缩短， 有翅蚜率和产仔量增加， 但与对照相比均未达到显著差异(P=0.392＞0.05)； 不同剂量吡虫啉拌种处理的麦长管蚜净生殖率、 内禀增长率、 周限增长率比对照偏高， 而种群加倍时间、 平均世代周期比对照偏低， 但均未达到显著性差异（P=0.406）。结果说明小麦籽粒中的吡虫啉微量残留对麦长管蚜生长发育无显著不利影响， 但对其生殖能力具有一定的促进作用。

关键词： 麦长管蚜； 吡虫啉； 拌种； 残留； 发育历期； 生殖力 生命表参数

Abstract： This study aims to detect imidacloprid residue in wheat seeds harvested form seeds treated with different dosages of imidacloprid and its impact on the development and reproduction of the grain aphid, *Sitobion avenae* (Fabricius). Wheat seeds were coated with imidacloprid (60% FS) in a proportion of 2, 4, 6, and 8 g/kg, respectively, and imidacloprid residue in harvested wheat seeds was detected by UPLC-MS/MS. Life table of *S. avenae* laboratory populations was constructed to compare various parameters of this insect feeding on wheat plants grown from the harvested seeds. The results showed that imidacloprid residue was positively correlated with the treatment dosage, and the residue in wheat seeds harvested form seeds treated with 8 g/kg imidacloprid reached the highest level (0.0290 mg/kg). Life table metrics showed that the larval and imaginal periods were shortened, and the proportion of alates and aphid fecundity were increased in the treatments, but no significant difference existed in these parameters between the treatments and the control (P=0.392＞0.05). Net reproduction rate, the intrinsic rate of increase and the finite rate of increase in the treatments were, respectively, higher than those of the control. In addition, the population doubling time and the mean generation time in the treatments were reduced compared to the control. But there were no significant differences in all of the parameters between the treatments and the control (P=0.406). The results suggest that trace residue of imidacloprid in wheat seeds has no significant impact on the development of *S. avenae*, but affects the reproductive capacity of aphids in certain degree.

Key words： *Sitobion avenae* imidacloprid seed dressing residue developmental duration fecundity life table parameters

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