2023年第31期 总392期

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前沿资讯

1. What Are Some of the Most Important Business Issues in the Tea Industry Today?（当今茶产业最重要的商业问题是什么?）

简介：As of late, the North American tea industry has developed into a thriving business sector that caters to a diverse range of consumer preferences – from the traditional to the untraditional – and consumer demands. This evolution can be attributed to various factors, including shifting consumer trends (such as a focus on health and wellness), supply chain changes, and the ongoing rise of the digital landscape. As a result, there has certainly been a range of significant changes in production methods, distribution channels and marketing strategies, among others. With this rapid transformation of the tea industry, it has become crucial for businesses to adapt to the evolving landscape in order to thrive and grow. Some of the challenges and considerations faced by tea businesses today are markedly different from those encountered even just a few years ago. However, by gaining a comprehensive understanding of the current issues, tea enterprises can position themselves strategically and navigate the complex landscape of the industry with confidence.

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学术文献

1. Uptake, translocation and subcellular distribution of broflanilide, afidopyropen, and flupyradifurone in mustard (*Brassica juncea*)（芥菜对溴虫氟苯双酰胺、双丙环虫酯和氟吡呋喃酮的吸收、转运和亚细胞分布）

简介：Novel pesticides broflanilide (BFI), afidopyropen (ADP), and flupyradifurone (FPO) have been widely used and become the new organic pollutants. However, uptake, translocation and residual distribution of BFI, ADP, and FPO in plants remain unclear. Therefore, residues distribution, uptake, and translocation of BFI, ADP, and FPO were investigated in mustard field trials and hydroponic experiments. The field results indicated that the residues of BFI, ADP, and FPO were 0.001–1.87 mg/kg at 0–21 d and dissipated fast in mustard (half-lives=5.2–11.3 d). More than 66.5 % of FPO residues were distributed in the cell-soluble fractions because of their high hydrophilicity, while hydrophobic BFI and ADP were primarily stored in the cell walls and organelles. The hydroponic data showed that the foliar uptake rates of BFI, ADP, and FPO were weak (bioconcentration factors<1), but the root uptake rate was strong (bioconcentration factors>1). The upward and downward translations of BFI, ADP, and FPO were limited (translation factor<1). BFI and ADP are uptake by roots *via* apoplast pathway, and FPO is uptake *via* symplastic pathway. This study contributes to the understanding of the formation of pesticide residues in plants and provides a reference for safe application and risk assessment of BFI, ADP, and FPO.

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2. Risk Assessment of Fluxametamide Resistance and Fitness Costs in Fall Armyworm (*Spodoptera frugiperda*)（草地贪夜蛾对氟噁唑酰胺抗性和适应成本的风险评估）

简介：The fall armyworm (FAW), *Spodoptera frugiperda*, is one of the most devastating invasive polyphagous pests, which has attracted recent global attention by developing resistance to various insecticidal active ingredients with independent mode of action. Fluxametamide, a newly commercialized isoxazoline insecticide, is exceptionally selective towards several lepidopteran pests. The present study aimed to evaluate resistance risk in FAW to fluxametamide and the fitness costs associated with fluxametamide resistance. A field-collected and genetically mixed population of FAW was artificially selected through continuous exposure to fluxametamide. After successive selection of 10 generations, there was no obvious increase in the LC_{50} (RF: 2.63-fold). The realized heritability (h^2) of fluxametamide resistance was estimated as $h^2 = 0.084$ using a quantitative genetic approach. Compared with the susceptible F0 strain, the Flux-SEL (F10) strain of FAW displayed no significant cross-resistance to broflanilide, chlorantraniliprole, fipronil, indoxacarb, lambda cyhalothrin, spinetoram, and tetraniliprole, except emamectin benzoate (RF: 2.08-fold). Increased activity of glutathione S-transferase (ratio 1.94) was observed in the Flux-SEL (F10) strain of FAW, while the cytochrome P450 and carboxylesterase activities were not altered. The fluxametamide-selection significantly affected the development and reproductive traits of FAW with a lower R_0, T and relative fitness (R_f = 0.353). The results alluded that the risk of fluxametamide resistance evolution in FAW is relatively lower; however, proactive implementation of resistance management approaches should be done to maintain the field efficacy of fluxametamide against FAW.
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3. Resistance risk assessment in diamondback moth, *Plutella xylostella* (L.) to fluxametamide（小菜蛾对氟噁唑酰胺的抗性风险评价）

简介：The present study aimed to assess the risk of resistance in *P. xylostella* to fluxametamide under laboratory conditions. After the repeated exposure to fluxametamide for successive 18 generations of *P. xylostella*, there was 3.095-fold increase in the LC_{50}. When the realized heritability (h^2) of *P. xylostella* to fluxametamide in the open field was assumed to be the laboratory-estimated value ($h^2 = 0.180$) and the mortality was 70–90%, only 22.9–33.1 generations were expected to be required to obtain a 10-fold increase in fluxametamide resistance. Compared with the laboratory susceptible strain (F_0), the *Flux-SEL* (F_{18}) strain exhibited a very low level of cross-resistance to emamectin benzoate (5.17-fold) and no significant cross-resistance to fipronil or flubendiamide. With the F_0 and the *Flux-SEL* test

strains (F_{12}, F_{15} and F_{18}), the specific activities of cytochrome P450 and glutathione *S*-transferase showed a remarkable increase during selection, while the esterase activity did not differ significantly. The results indicated that a potential risk of resistance development to fluxametamide exists in *P. xylostella* after continuous exposure. These pieces of information will be crucial in formulating rational fluxametamide application and resistance management guidelines for controlling *P. xylostella* under field condition.

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4. Field-evolved resistance and mechanisms in *Bemisia tabaci* Asia I to a novel pyropene insecticide, afidopyropen, in India（印度烟粉虱Asia I型对一种新型pyropene杀虫剂双丙环虫酯的田间抗性及其机制）

简介：The cotton whitefly, *Bemisia tabaci* (Gennadius) is a devastating polyphagous insect pest worldwide and has been shown to be resistant to insecticides in most chemical classes. The newly commercialized pyropene insecticide afidopyropen provided a new tool to control *B. tabaci* because of high selectivity and its novel mode of action. This study aimed to evaluate the susceptibility of *B. tabaci* Asia I from ten provinces of India to afidopyropen and other commonly used insecticides. Most field-collected populations were susceptible to afidopyropen, with LC_{50} values varying from 4.37 to 16.62 mg L^{-1}. However, four field populations (W-MH, K-UP, M-WB and L-PN) exhibited moderate levels of resistance (28.53, 19.09, 35.27 and 30.81-fold, respectively), but no cross-resistance to cyantraniliprole and pymetrozine. Diethyl maleate (DEM) significantly restored the susceptibility of W-MH, M-WB and L-PN strains of *B. tabaci* to afidopyropen, whereas piperonyl butoxide (PBO) significantly inhibited afidopyropen resistance in K-UP, M-WB and L-PN populations. The activities of glutathione *S*-transferase (GST) and P450 monooxygenase increased in the afidopyropen-resistant field strains, while esterase activity did not change significantly. The present study showed a regional variation in afidopyropen toxicities among *B. tabaci* Asia I populations from different agro-climatic zones of India, which suggests a potential risk of afidopyropen resistance development. Metabolic detoxification mediated by GST and P450 monooxygenase was associated with afidopyropen resistance in *B. tabaci* Asia I.

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相关专利

1. TRACEABILITY SYSTEM FOR PESTICIDE RESIDUES（农药残留追溯系统）

简介：本发明专利公开了一种农药残留溯源系统，其技术方案要点：步骤1，采集多种作物常用农药的基本性质；步骤2，收集农药在多种不同类型土壤中的降解特性；步骤3，收

集降雨量、灌溉条件等农业经营要素；步骤4，预测使用后土壤表面农药残留风险，推测农药对作物的转移污染；步骤5，预测农药使用后可渗入地下水的农药残留量；步骤6，预测农药使用后可渗入地表水的农药残留量。 农药残留追溯系统为农业生产者、环保和立法机构、农业生产管理部门提供了一套实用的农药残留风险评估工具。

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