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小菜蛾血淋巴对玫烟色棒束孢入侵的生理防御反应

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Physiological defense responses of *Plutella xylostella* (Lepidoptera: Plutellidae) larvae infected by entomopathogenic fungus *Isaria fumosorosea*

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摘要 为了探讨小菜蛾*Plutella xylostella*血淋巴对玫烟色棒束孢*Isaria fumosorosea*的防御机制， 利用吉姆萨染色法在光镜下观察了小菜蛾4龄幼虫血细胞感染不同致病力玫烟色棒束孢后的免疫反应。结果表明： 玫烟色棒束孢的入侵可导致小菜蛾血细胞数量发生改变， 表现为入侵初期血细胞总数增加， 不同类型血细胞比例改变等。体表接种后8-45 h， 高致病力菌株PFCF-001处理的幼虫血细胞总数在24 h出现最高值6 250个/mm^3， 而低致病力菌株PFCF-D58处理在36 h达到最高值3 000个/mm^3， 比高致病力菌株处理滞后12 h。不同菌株处理下虫体参与防御反应的主要血细胞类型为浆血细胞和粒血细胞。小菜蛾幼虫血细胞在感菌初期能够产生粘附、吞噬、包被及形成结节等一系列防卫反应， 但最终无法抵挡高致病力菌株PFCF-001的侵染。结果说明小菜蛾幼虫血淋巴对玫烟色棒束孢的防御反应只有短暂的抑制作用， 不能从根本上清除、 消灭玫烟色棒束孢。

关键词： 玫烟色棒束孢 小菜蛾 血淋巴 生理防御反应 致病菌株

Abstract: To explore the defense responses of *Plutella xylostella* (Lepidoptera: Plutellidae) hemolymph against the infection of different strains of entomopathogenic fungus *Isaria fumosorosea* (syn. *Paecilomyces fumosoroseus*) (Hypocreales: Cordycipitaceae), cellular immune responses of the infected 4th instar larvae was investigated with optics microscope and Giemsa stain. The results indicated that the invasion of *P. xylosetlla* by *I. fumosorosea* resulted in changes in the characteristics of host hemolymph, including the initial increase of the total numbers of hemocytes, and the change of the proportion of differential hemoeytes in association with fungal infection processes. During 8-45 h post inoculation, the peak response reached to 6 250/mm^3 at 24 h after invasion by the highly pathogenic strain PFCF-001. The highest total hemocyte counts (3 000/mm^3) were observed at 36 h when *P. xylostella* larvae were inoculated with the least pathogenic strain PFCF-D58, which was 12 h later than the treatment of strain PFCF-001. The major defense hemocytes were plasmatocytes and granulocytes. Different types of cellular immune responses were observed at the early stage of infection including adhesion, phagocytosis, hemocytic aggregation, encapsulation and nodule formation. However, the defense responses of the *P. xyolstella* against the highly pathogenic strain of *I. fumosorosea* just inhibited the pathogen temporarily but could not clear it completely.

Key words: *Isaria fumosorosea* *Plutella xylostella;* hemolymph physiological defense responses pathogenic strain

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