番茄抗晚疫病與抗萎凋病分子標誌產業應用

The application of specific molecular markers for resistance to late blight and fusarium wilt in tomato

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摘要：

番茄晚疫病(late blight)與萎凋病(Fusarium wilt)為國際重要真菌性病害，目前國外有關抗病基因檢測文獻多需利用耗時且高價限制酶切反應方能鑑別抗感病基因。本研究自亞洲蔬菜中心收集抗病與感病番茄品種，針對抗晚疫病基因(*Ph-2*、*Ph-3*)與抗萎凋病基因(*I-2*、*I-3*)開發共顯性 SCAR 分子標誌。目前已建立快速且便宜的專一性 Ph2TG422-SCAR 分子標誌，可同時擴增抗感晚疫病 *Ph-2* 基因植株 DNA 條帶，大小分別為 400 bp 及 570 bp；專一性 Ph3M67-SCAR 分子標誌則可同時擴增抗感晚疫病 *Ph-3* 基因植株 DNA 條帶，大小分別為 350 及 250 bp；至於 Pi-2 與 Pi-3 分子標誌可鑑定番茄晚疫病病原菌。結合 I2/Fu 分子標誌能夠同時擴增抗感萎凋病 *I-2* 基因植株與萎凋病菌 DNA 條帶，大小分別為 0.7、2.3 與 1 kb；專一性 I3PTG190-SCAR 分子標誌可同時擴增抗感萎凋病 *I-3* 基因植株 DNA 條帶，大小分別為 210 與 310 bp。綜合上述分子標誌檢測結果與亞洲蔬菜中心及國內育種者或種子公司品種已知的抗感性吻合，可作為育種者判斷番茄育成品系之抗病基因型及育成多基因組合雜交品種，可大幅提升育種效率，具有高市場潛力及產業應用價值。

Summary：

Late blight and fusarium wilt are the most important fungal diseases of tomato worldwide. Restriction enzyme digestion is time- consuming and costly based on the reported disease-linked markers . In thestudy, the disease resistance and susceptible lines of tomato were obtained from AVRDC-The World Vegetable Center for developing the co-dominance marker linked to late blight *(Ph-2*, *Ph-3*) and fusarium wilt (*I-2*, *I-3*) diseases. Amplification with markers Ph2TG422-SCAR for *Ph-2* gene and Ph3M67-SCAR for *Ph-3* gene showed resistant fragments (bands at 400 and 350 bp) and susceptible fragments (bands at 570 and 250 bp) respectively to tomato late blight. . However, markers Pi-2 and Pi-3 specific amplifed pathogen of late blight. . The combined effect of the two markers I2/ Fu for *I-2* gene produced amplification at 0.7 kb in resistant lines, 2.3 kb in susceptible lines and 1 kb in pathogen of Fusarium wilt. Amplification with marker I3PTG190-SCAR for *I-3* gene showed 210 bp in resistant lines and 310 bp in susceptible lines respectively to tomato Fusarium wilt. Results in this study showed PCR-based marker system have been consistent with phenotypic data from the AVRDC-The World Vegetable Center or other seed company. Therefore, developed molecular markers could help breeder to have a wide choice of genotypes in marker-assisted selection of disease-resistant tomato cultivars, resulting in enhancing more efficient breeding procedures.. It should save the cost and has high potential for industrial

application and market value.