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CONTROLLED ATMOSPHERE AND TEMPERATURE TREATMENT SYSTEM TO DISINFEST PEACH FRUIT MOTH, *CARPOSINA SASAKII* MATSUMURA (LEPIDOPTERA: CARPOSINIDAE) ON APPLES

Yerim Son¹, Ikjo Chon², Lisa Neven³, Youngmi Moon⁴, Donghun Cho⁵, and Yonggyun Kim^{1*}

¹Department of Bioresource Sciences, Andong National University, Andong 760-749, Korea

²Department of Horticulture and Breeding, Andong National University, Andong 760-749, Korea

³Yakima Agricultural Research Laboratory, USDA-ARS, Wapato, WA 98951, USA

⁴Plant Quarantine Technology Center, Animal, Plant and Fisheries Quarantine and Inspection Agency, Anyang 480-757, Korea

⁵Plant Pest Control Division, Animal, Plant and Fisheries Quarantine and Inspection Agency, Anyang 480-757, Korea

*Corresponding author's e-mail: hosanna@andong.ac.kr

ABSTRACT

Carposina sasakii Matsumura (Lepidoptera: Carposinidae) is a serious insect pest of apples and peaches in Korea and Japan. Its internal feeding behavior makes difficult to control this insect pest with conventional spray pesticide applications. Due to its limited distribution, *C. sasakii* has been identified as a quarantine pest in several countries. Although fumigation with methyl bromide is used to meet phytosanitary requirements, it can cause significant damage to the ozone layer. In order to replace methyl bromide fumigation as a postharvest treatment, a Controlled Atmosphere/Temperature Treatment System (CATTs) was tested as an alternative treatment against *C. sasakii* in apples. The last instar was the most tolerant immature stage to a heat treatment of 44°C for 20 min. CATTs conditions consisted of a linear heating rate of 16°C/h to a final chamber temperature of 46°C and an apple internal temperature of 44°C under a 15% carbon dioxide and 1% oxygen environment. When the apples infested with different stages of *C. sasakii* were treated under CATTs conditions, young larvae (first – fourth instars) did not survive 40 min exposure, but the fifth instars required an exposure of at least 60 min to achieve complete mortality. A partial heat shock protein 90 (hsp90) was cloned and showed inducible expression in response to heat shock at 44°C. CATTs suppressed transcription in hsp90 gene expression. Apples did not show any appreciable loss of quality in relation to fruit firmness, sweetness, and decay after a 60 min CATTs treatment. These results suggest that CATTs can be applicable to control *C. sasakii* in apples.