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EFFECTS OF ISOFLAVONOIDS FROM *Cicer* ON LARVAE OF *Heliocoverpa armigera*

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Abstract—Four recently identified isoflavonoids, isolated from wild relatives of chickpea, *Cicer arietinum*, were shown to deter larval feeding by *Heliocoverpa armigera* at 100 ppm, judaicin and maackiain retained their antifeedant activity at 50 ppm and 10 ppm, respectively. The isoflavonoids were tested in combinations and with chlorogenic acid; the combinations containing judaicin and maackiain were most active, and chlorogenic acid enhanced the antifeedant activity of all four isoflavonoids. *H. armigera* was the only one of four noctuids to be deterred by all four isoflavonoids. *Spodoptera littoralis* was deterred by judaicin alone and *S. frugiperda* by maackiain alone. *Heliothis virescens* and *S. exigua* were not deterred from feeding by any of the isoflavonoids. When incorporated into a diet, isoflavonoids decreased the weight gain of early stadia larvae of *H. armigera* more than they did later stadia, and maackiain and judaicin were most potent. We conclude that the isoflavonoids, especially maackiain and judaicin, could play a role in decreasing the susceptibility of *Cicer* to attack by *H. armigera.*

Key Words—*Heliocoverpa armigera, Cicer arietinum,* isoflavonoids, chlorogenic acid, *Heliothis virescens, Spodoptera littoralis, Spodoptera exigua, Spodoptera frudiperda,* maackiain, judaicin, antifeedant.

INTRODUCTION

The chickpea, *Cicer arietinum* L., is an important staple food resource in semi-arid tropical regions. The plant is susceptible to attack by a range of pathogens and insects, especially by the noctuid caterpillar, *Heliocoverpa armigera*. Previous studies have shown that the foliar and root isoflavonoids, medicarpin and

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