

## **MOLECULAR MARKERS DISTINGUISHING ENCYRTID (Hymenoptera: Encyrtidae) PARASITOIDS ATTACKING SOFT SCALE INSECTS (Hemiptera: Coccidae)**

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### **ABSTRACT**

Reciprocal molecular markers were developed to distinguish the closely related parasitoid genera *Encyrtus* Latreille, *Metaphycus* Mercet and *Paraceraptocherus* Girault (Hymenoptera : Encyrtidae). These parasitoids are widely used in the biological control of soft scales and based upon morphology, it is extremely difficult to distinguish them. DNA extraction and RAPD-PCR were used to assess the amount of genetic variation within and among species at this locus. From parsimony analysis, populations of *Encyrtus inflex* (Embleton), *Metaphycus anneckei* Guerrieri & Noyes and *Paraceraptocherus africanus* Girault were separated. Specific DNA markers of *E. inflex*, *P. africanus* and *M. anneckei* at *M.W.* of (475.07, 429.60, 311.37bp) and (473.33bp), (700.0, 400.0 and 270.59bp) and, (918.79, 814.45, 771.44bp) for (AC07), (AE02), (B10) and (B07) primers, respectively were used. Based upon the sequence variation among species, the present study appeared a simple molecular assay to rapidly and unambiguously distinguish *E. inflex*, *P. africanus* and *M. anneckei* species.

**Keywords:** Encyrtidae , molecular markers, parasitoids and soft scale.

### **INTRODUCTION**

Soft scale insects (Hemiptera: Coccidae) feed on the phloem of the host plant and were found on stems, leaves and green twigs where they are associated with veins. Damage due to feeding by an individual scale is small. However, large populations result in yellowing, defoliation, reduction in fruit set and loss in plant vigor (Hamon and Williams, 1984). The control of soft scale insects by traditional chemical means has become a problem because of ground water contamination and pest resistance, which makes it necessary to develop alternative means of control. Encyrtids ( Hymenoptera : Encyrtidae) are common parasitoids of soft scales. These parasitoids include members of the genera *Encyrtus* Latreille, *Metaphycus* Mercet and *Paraceraptocherus* Girault which have been used with success in several biocontrol programs ( Ben-Dov and Hodgson, 1997). *Encyrtus*, *Metaphycus* and *Paraceraptocherus* have become the most successful natural enemies in biological control after their use to control the greenhouse soft scale insects especially *Saissetia oleae* Olivier and *Saissetia coffeae* (Walker) (Hemiptera: Coccidae) (Abd-Rabou, 2001a). There are documented behavioral differences among strains of *Encyrtus*, *Metaphycus* and *Paraceraptocherus* . The strains showed consistent differences in percent parasitization and other life-history characteristics as compared with commercially reared strains of