

Morphological and Enzymatic study of the

Genus *Trichogramma* in Iran.

(Hym. Trichogrammatidae)

E. EBRAHIMI , B. PINTUREAU , M. SHOJAI

Plant pests and Diseases Research institute, INSA, UA INRA, Biologie

406, 20 avenue A. Einstein, 69621 - Villeurbanne cedex, France

and Islamic Azad University, Tehran

ABSTRACT

Eight species of the genus *Trichogramma* Westwood were collected and identified from different parts of Iran on different lepidopterous hosts. Morphology of male genitalia, male antenna and enzymatic data were used for identifications. Electrophoretic study of esterases was performed on vertical polyacrylamide gel in 23 populations of *T.brassicae*, *T.evanescons*, *T.embryophagum* and *T.semblidis*. Twenty adult descendants chosen at random or twenty adult descendants of one virgin female were used for preparing each hemogenate and twenty hemogenate from each population were used. The species, their hosts and localities are as follows:

1. *Trichogramma brassicae* Bezdenko, 1968: On eggs of *Spectrobates ceratoniae*, *Lita ocellatella* , *Helicoverpa armigera*, *Papilio demoleus*, *Ostrinia nubilalis*, *Chilo suppressalis*, *Lobesia botrana* and *Cydia pomonella* in Yazd, Saveh, Mashhad, Varamin, Amol, Sari, Babol, Gorgan, Abyek, Orumieh, Kashmar, Tonekabon, Ramsar, Rasht, Shahrekord, Shabastar, Mianeh, Najafabad, Zanjan, Tabriz and Moghan. (Figs. 3A, 3B, 7A). This is the most widespread species of *Trichogramma* in Iran.
2. *Trichogramma evanescons* Westwood, 1833; on eggs of *Spectrobates ceratoniae*, *Chilo*

suppressalis, *Ostrinia nubilalis*, *Cydia pomonella* and *Helicoverpa armigera* in Tonekabon, Chalus, Esfahan, Anzali, Abyek, Gorgan, Babolsar, Sari, Mashhad, Saveh, Amol, Zonooz (Figs. 3C, 3D, 7B).

3. *Trichogramma embryophagum* (Hartig, 1838); on eggs of *Cydia pomonella* in Orumieh, Tabriz, Zonooz, Amol. (Figs. 4A, 4B, 7C), This is a thelytokous species and PCR study showed that thelytoky in this species is due to the presence of a rickettsia, *Wolbachia trichogrammae* Louis & Pintureau.
4. *Trichogramma dendrolimi* Matsumura, 1926; on eggs of *Cydia pomonella* in Mashad and Neyshaboor (Figs. 4C, 4D).
5. *Trichogramma semblidis* (Aurivillius, 1897), on eggs of *Cydia pomonella* and *Spedon spegea* in Orumieh, Naghadeh, Rasht and Tarom (Figs. 5A, 5B, 7D).
6. *Trichogramma principium* Sugonjaev & Sorokina, 1976; on eggs of *Cydia pomonella* and *Chilo suppressalis* in Tabriz, Behshahr, Marand, Orumieh (Figs 5C, 5D).
7. *Trichogramma tshumakovae* Sorokina 1984; on eggs of *Chilo suppressalis* in Amol (Figs 6A, 6B).
8. *Trichogramma pinto*i Voegelé, 1982; on eggs of *Cydia pomonella*, *Ostrinia* and *Plusia* in Mashad, Neyshaboor, Moghan.

Figures are presented in Persian text.

References

- HINTZELMANN, V., 1925. Beitrage zur Morphologie von *Trichogramma evanescens* Westw.- Arb. biol. Reichsanst. Land - U. Forstw. 14: 225-230
- LI, LI YING, 1994. Worldwide use of *Trichogramma* for biological control on different crops: A survey. In "Biological control with egg parasitoids". Eds. Wajnberg & Hassan, CAB International, p 33-53
- NAGARAKATTI, S. & NAGARAJA, H., 1971: Redescriptions of some known species of *Trichogramma* (Hym. Trichogrammatidae) showing the importance of the male genitalia as diagnostic character. *Bulletin of Entomological Research* 61: 13-31

- PINTO, J.D., PLATNER, G.R. & OATMAN, E.R., 1978: Clarification of the identity of several common species of North American *Trichogramma*. *Annals of the Entomological Society of American* 71: 169-180
- PINTO, J.D. & STOUTHAMER, R., 1994: Systematics of the Trichogrammatidae with emphasis on *Trichogramma*. In "Biological control with egg parasitoids" Eds. Wajnberg & Hassan, CAB International, p 1-36
- PINTUREAU, B., 1987: Systématique évolutive du genre *Trichogramma* Westwood en Europe. Thèse Doctorat d'Etat, Univ. Paris VII. France. 311 PP.
- PINTUREAU, B., 1990: Polymorphisme, biogéographie et spécificité parasitaire des Trichogrammes européens (Hym. Trichogrammatidae). *Bulletin de la société entomologique de France* 95: 17-38
- PINTUREAU, B., 1994: Phylogenetic study of the European species of the genus *Trichogramma* Westw. *Trends in Agric. Sci., Entomol.* 2: 141-150
- PINTUREAU, B. & VOEGELÉ, J., 1980: Une nouvelle espèce proche de *Trichogramma evanescens*: *T. maidis*. (Hym. Trichogrammatidae). *Entomophaga* 25: 431-440
- RUSSO, J. & PINTUREAU, B., 1981: Etude biométrique de quatre espèces de *Trichogramma* Westwood, *Annales de la société Entomologique de France* 17: 241-258
- SHOJAI, M., TERGARI, S., AZMA, M. & NASROLLAHI, A.A., 1990: Faunistic study of beneficial parasitoid wasps *Trichogramma* and prospect for their application in agricultural field in Iran. *Iranian Research Organization for Science and Technology*, (in Persian with English abstract), PP: 33-47
- TELENGA, N.A., 1958: Taxonomical and ecological characteristics of species from the genus *Trichogramma*. *Transactions of the first International Conference on Insect Pathology and Biological Control*. Prague, PP. 355-359
- VOEGELÉ, J. & BERGÉ, J.B., 1976: Les Trichogrammes, (Insects Hyménopt.

Chalcidiens, Trichogrammatidae) caractéristiques isoestérasiques de deux espèces: *Trichogramma evanescens* Westw. et *T. acheae*. Nagaraja, Nagarakatti. *Comptes Rendus des Séances de l'Académie de Sciences Paris* 283: 1501-1503

VOEGELÉ, J., CALS-USCIATI, J., PIHAN, J.P. & DAUMAL, J., 1975: Structure de l'antenne femelle des Trichogrammes. *Entomophaga* 20: 161-169

VOEGELÉ, J. & PINTUREAU, B., 1982: Caractérisation morphologique des groupes et espèces du genre *Trichogramma* Westwood, In "Les Trichogrammes" Ed. Voegelé J., Les colloqued de l'INRA 9:45-75

Address of the Authors: Eng. E., Ebrahimi, Plant Pests & Diseases Research Institute,

P. O. Box 1454, 19395 Tehran, Iran

Dr. B., Pintureau, INSA, UA INRA, Biologie 406, 20 avenue A. Einstein, 69621, Villeurbanne cedex, France

Dr. M., Shojai, Islamic Azad University, Science and Research Branch. Tehran, Iran