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## REARING OF TRICHOGRAMMA SPECIES (T. Evanescens, T. Pintoi, T. Chilonis) IN VITRO CULTURE

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## REARING OF TRICHOGRAMMA SPECIES (*T. Evanescens*, *T. Pintoi*, *T. Chilonis*) IN VITRO CULTURE

This article reports *Trichogramma evanescens*, *Trichogramma pintoii* and *Trichogramma chilonis* (Hymenoptera: *Trichogrammatidae*) were cultured in vitro from eggs to adults on artificial diets, which contained no insect components. The results of our experiments using artificial media devoid of insectan additives for rearing *T. evanescens*, *T. pintoii*, *T. chilonis* in vitro.

Key words: *Artificial media, parasitoid growth factors, in vitro, hemolymph, egg yolk, inorganic salt mixture, cow milk, Trichogramma spp, biological efficiency.*

### INTRODUCTION

At the process of entirely rearing trichogramma parasite in the laboratory condition cultivates *Sitotroga cerealella* Olive egg a lot of corn productions such as grain, maize, barley and worker force are spent. In the result of it, rearing price is increased. More than 150-thousand-ton barley is emitted in exist biolaboratories in Uzbekistan in a year [4;5;6].

Emitting this barley, other diets cultivation happens in the account of decreasing producing of plants or enterprises. This testifies that above mentioned process is damaging for diets industry.

In Uzbekistan 2014-2016 years for 3 year' investigations rearing trichogramma in the diets medium, which belongs to artificial medium researches showed its good results. (Jumaev R., 2016., 2017).

The artificial rearing of *Trichogrammatidae* started a long time ago, with the main goal to try obtaining a mean to multiply and produce parasitoids to be released in biological control strategies. But it is also a powerful tool to conduct studies on biology, physiology and behavior of entomophages, especially endoparasitoid species [1;3;5].

### MATERIALS AND METHODS

*Trichogramma* stock: *T. evenecens*, *T. pintoii*, *T. chilonis* were collected from Tashkent province, Buka, Okkurgan and Piskent districts, and reared in the laboratory on *Heliothis armigera* and *Agretus segetum*.

Ingredients for in vitro medium: Pupae hemolymph (*G. melonnellan* or *H. armigera*), cow milk or 10% powdered milk solution, chicken embryo extract and Neisenheimer's mixture salt.

Preparation of the ingredients

✓ Insect hemolymph collection: A live pupa was immersed in water bath at 60°C for 6 or 7 min to avoid blackening of the hemolymph. After surface sterilization with alcohol and need sterile condition.

Chicken embryo extract collection: The Chicken embryo extract, only it should be the egg yolk and need sterile condition (Jumaev R., 2016., 2017).

✓ Milk: Fresh cow milk or 10% powdered milk solution also need sterile condition.

✓ Inorganic mixture salt: Use Neisenheimer's mixture salt (NaCl 7.5 g, KCl 0.1 g, CaCl<sub>2</sub> 0.2 G, NaHCO<sub>3</sub> 0.2 g, H<sub>2</sub>O 100 ml).

Artificial "egg-cards"

There are 2 types of artificial "egg-cards" Tri-ring "egg-cards" 2 pieces of plastic film are used. The semispherical concaves are made on the upper plastic film. Artificial medium is poured into concaves fully (but without overflow) with a micro-syringe or micro-pipette. The bottom plastic film has no concaves. The upper and bottom plastic films are separated and stretched tightly by three plastic ring with different inner diameters, in our Cass they are: 5.5 cm, 5.4 cm, 5.2 cm respectively [1;2;4].

Components of artificial diets for 3 *Trichogramma* spp.

The first medium: for *Trichogramma evanescens*, Hemolymph (A) *G. melonnellan* (A<sub>1</sub>) 41.5±0.5 %, Neisenheimer's (A<sub>2</sub>) 15.5±0.5 %, Chicken egg yolk (A<sub>3</sub>) 20.5±0.5 %, milk (A<sub>4</sub>) 22.5±0.5 %.

The second medium: for *Trichogramma pintoi*, Hemolymph (B) *Heliothis armigera* (B<sub>1</sub>) 45.5±0.5 %, Neisenheimer's (B<sub>2</sub>) 13.5±0.5 %, Chicken egg yolk (B<sub>3</sub>) 20.5±0.5 %, milk (B<sub>4</sub>) 20.5±0.5 %.

The three medium: for *Trichogramma chilonis*, Hemolymph (C) *Agretus segetum* (C<sub>1</sub>) 45.2±0.5 %, Neisenheimer's (C<sub>2</sub>) 13.2±0.5 %, Chicken egg yolk (C<sub>3</sub>) 21.6±0.5 %, milk (C<sub>4</sub>) 20.0±0.5 %. [2;4;5;6].

### THE RESULTS OF THE RESEARCH

It was showed in the Table 1 that the pupae hemolymph of either *G.melonnellan* or *H.armigera* Hb could be used as the main component of the artificial diet for the development of *T. evenescens*, *T. pintoi*, *T.chilonis*. There was no significant difference in their parasitism, survival, percentage of pupation, adult emergence and reproductively when the pupae hemolymph of *G.melonnella* was used instead of that of *H.armigera* Hb [4;5].

Table 1.

**Development of *Trichogramma* spp, (*T. Evanescens*, *T. Pintoi*, *T. Chilonis*) reared in vitro laboratory experiences, 2017-2019 year. (+26±2°C, RH 75±3 %)**

№	Composition of medium %				The amount of damage %	Development degree of <i>Trichogramma</i> spp generation in artificial medium by days				Genders proportion ♂: ♀
						larva period	Pupa period	Mature period (imago)	larva period	
1.	Trichogramma evanescens				68,3	1,5±0.3	4,3±0.3	4,2±0.5	3,5±0.5	1:4
	TE <sub>1</sub>	TE <sub>2</sub>	TE <sub>3</sub>	TE <sub>4</sub>						
	41.5±0.5	15.5±0.5	20.5±0.5	22.5±0.5						
2.	Trichogramma pintoi				81,8	1,6±0.3	4,6±0.3	4,4±0.5	4,2±0.5	1:5
	TP <sub>1</sub>	TP <sub>2</sub>	TP <sub>3</sub>	TP <sub>4</sub>						
	45.5±0.5	13.5±0.5	20.5±0.5	20.5±0.5						
3.	Trichogramma chilonis				83,5	1,8±0.3	5,1±0.3	4,8±0.5	5,9±0.5	1:7
	TC <sub>1</sub>	TC <sub>2</sub>	TC <sub>3</sub>	TC <sub>4</sub>						
	45.2±0.5	13.2±0.5	21.6±0.5	20.0±0.5						
Control					91,3	1.4	4.1	3.7	7.5	1:7
<i>H.armigera</i> eggs										

It is obvious in the research, prepared all mediums of diets are harmed with *Trichogramma* spp generation and put their eggs [4;5;6].

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#### ***Trichogramma* турларини (*T. Evanescens*, *T. Pintoi*, *T. Chilonis*) инвитро усулида кўпайтириш**

Ушбу мақолада *Trichogramma evanescens*, *Trichogramma pintoi* va *Trichogramma chilonis* (Hymenoptera: Trichogrammatidae) турлари in vitro усулида сунъий озуқа мухитларида кўпайтирилган. *T. evanescens*, *T.pintoe*, *T.chilonis* трихограмма турлари in vitro усулида кўпайтириш учун турлий хил хашаротларнинг гемолимфаларидан фойдаланилган холда ўтказилган илмий тажрибалар ёритилган.

**Сулаймонов Б.А., Жумаев Р.А., Абдувосикова Л.А.**

**Размножение трихограмма спесис (*T. Evanescens*, *T. Pintoi*, *T. Chilonis*) в инвитро**

В этой статье сообщается, что *Trichogramma evanescens*, *Trichogramma pintoi* и *Trichogramma chilonis* (Hymenoptera: *Trichogrammatidae*) разводили методом *in vitro* от яиц до имаго на искусственной питательной среде, не содержащей компонентов насекомых. Результаты наших экспериментов с использованием искусственных питательных сред, лишенных компонентов насекомых, для разведения *T. evanescens*, *T.pintoe*, *T.chilonis* методом *in vitro*.

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