Dr. PANJABRAO DESHMUKH KRISHI VIDYAPEETH, AKOLA
SEMESTER END THEORY EXAMINATION
B.Sc. (Hons.) Agriculture

Semester	**:**	**VI (New)**	**Academic Year**		**:**	**2020-2021**	
Course No.	**:**	**ENTO – 365**	**Title**	**:**	**Management of Beneficial Insects**		
Credits	**:**	**2 (1+1)**					
Day & Date	**:**	**12/6/2021**	**Time**	**:**	**3.00-4.00**	**Total Marks**	**:** **40**

Note: 1. Solve **ANY Four** questions in 4 to 5 Sentences from **SECTION "A".**
2. Solve **ANY Six**questions in one Sentences from **SECTION "B".**
3. All questions from **SECTION "C"** are compulsory.
4. Draw neat diagrams wherever necessary.

	Section "A" (16 Marks)
	(Write the answers in 4-5 sentences only. Each question carries 4 marks)
Q.1	Define Biocontrol and Write the Ideal Charcteristics of Bioagent.
Ans.	**Biocontrol** (01marks) Biological control or bio-control is a deliberate attempt to use natural enemies (NEs) either by introducing new species into the environment of a pest or by increasing the effectiveness of those already present bio-controls. **Ideal Charcteristics of Bioagent** (03 marks) 1. Should have high searching capacity of host and utilize the host. 2. Should be fairly host specific in feeding rather than polyphagous i.e. restriction infeeding habit to a relatively few species. This implies high degree of adaptation. 3. Should be primarily to its high potential reproductive capacity, ultimately high fecundity i.e. potential for rate of increase. 4. Ability to occupy all the host inhabited niches and to survive well. 5. Adaptation to broad range of climatic conditions. 6. Should be amenable to culture in the insectory. 7. It must be efficient to bring about the death of the host. 8. It should not become a plant feeder under any conditions. 9. It should not be hyperparasites or harmful to the beneficial species. 10. Must compete with other species of natural enemies successfully for occupying food,space and shelter and must destroy the pest population within short time even at high host density. 11. Should withstand refrigeration

Contd. 2

Q.2 Write the mass multiplication of *Trichogramma chilonis* in Laboratory with Field release technique.

Mass multiplication of *Trichogrammachilonis* in Laboratory with its Field releasetechnique. (04marks)

Ans. **Facilities required for Trichogramma rearing**

Refrigerator ,Honey ,UV chamber ,Glass tubes (15×3 cm) ,Air conditioner /water cooler,Gum Local/ Brown colour,Egg sprinkler ,Table lamp ,Trays ,Cotton ,Working tables ,Fluorescent tube light ,Scissors and brushes ,*Corcyra eggs* ,'Tricho' cards of specific size ,Polythene bag (25×20 cms) ,Clips

Methodology

1. Clean fresh Corcyra eggs by passing through 15, 30 and 45 mesh sieves. Treat the eggs under UV lamp for 45 minutes.
2. Prepare "Trichocard" by cutting card board sheet to the size of 13 x 20 cm(15x10 cm) which can accommodate 1 cc of eggs.
3. Apply natural brown gum on the card and sprinkle the cleaned eggs uniformly.
4. Remove the excess eggs from the cards by using brush
5. Allow the card for shade drying for few minutes.
6. Take polythene bag, insert UV treated "Trichocard" and **nucleus card** at the ratio of 6:1
7. Remove the Tricho cards after 5 days Corcyra eggs changes black colour on 5th day indicates the parasitization of eggs.
8. Release the parasitized egg cards immediately in the fields (or) store them in refrigerator at 10 degree centigrade up to 15 days.
9. Place/tie/staple parasitized cards on leaf sheath of plant

Release of Trichogramma in the field

1. Tricho cards' are cut into small pieces.
2. Adult emergence is occur after 8th day of parasitisation. Staple piece of 'Tricho card' on the lower side of the leaf to protect them from direct sunlight, rains and other factors.
3. The first dose of *Trichogramma*are given when the eggs observed in the field.
4. If the spraying is needed then it is done before or after the 7 days of release of parasitoids.
5. The gap between the release is about a week and it is upto the availability in the field.
6 Parasitized egg cards showing blackening of eggs can be stored in a refrigerator at 12-15^{0}C for 10-15 days.**ex.** Cotton pink boll worm :*Trichogrammachilonis*or *Trichogrammatoidaebactrea*@ 1,50,000/ha from 45th day onwards, 6 weekly releases or with the appearance of the pest.

Paddy stem borer :*Trichogrammajaponicum*@ 50,000/ha with the appearance of the pest or 30 days after transplantation, 6 releases to be made in one season. etc.

Q.3 Define voltinism and Write types of voltinism in silkworm

Ans. **Defination** : Voltinism is a term used in biology to indicate the number of broods or generations of an organism in a year (01 mark)

Types of voltinism in silkworm (03 mark)

Types of voltinism in silkworm :

1. Univoltinism – organisms having one brood or generation per year
2. Bivoltinism – organisms having two broods or generations per year
3. Multivoltinism – organisms having more than two broods or generations/ year
4. Semivoltinism – organisms whose generation time is more than one year
5. Partial vontinism :
   a) An organism wherein generations overlap in time, and so are not completely reproductively isolated.
   b) A population where the voltinism is mixed, because of genetic variation and/or because environmental stimuli.

Q.4 Describe Shellac and its uses.

Ans.

Shellac (02 mark)

Shellac is a natural gum resin. It is natural, non toxic, physiologically harmless and edible resin. Shellac is a hard, tough, amorphous, and brittle resin containing small amount of wax with characteristic pleasant odour. Its natural colour varies from dark red to light yellow.

When heated, it softens at 65-70 °C and melts at 84-90°C. Shellac is insoluble in water, glycerol and hydrocarbon solvents, but, dissolves readily in alcohols (methylated spirit) and organic acids. Shellac is acidic in character. It is thermoplastic, uv-resistant with excellent dielectric and film forming properties with high gloss, hardness and strength. It is powerful bonding material with low thermal conductivity used as fillers.

Uses of Shellac: (02 mark)

1. It is approved for various applications in the food industry.
2. It is used in coatings, e.g. citrus fruits and apples. As a parting and glazing agents for sweets, marzipan, chocolate etc.
3. It is used for digestive juice-resistant coatings for tablets.
4. It is used in manufacturing of photographic material, lithographic ink and for stiffening felt and hat material.
5. It is utilized in preparation of gramophone records.
6. Jewelers and goldsmiths use lac as a filling material in the hollows in ornaments.
7. It is also used in preparation of toys, buttons, pottery and artificial leather.
8. It is also used commonly as sealing wax.
9. As binder for foodstuff stamp inks, e.g. for cheese and eggs.
10. As binder for mascara, nail varnish additive conditioning shampoo, film forming agent for hair spray, micro-encapsulation for perfumes.

Q.5 Enlist different species of honey bees with scientific name and write the duties of worker.

Ans.

Different species of honey bee with scientific name (02 marks)

a. *Apisdorsata* : The rock bee Apidae.

b. *Apisceranaindica* : The Indian hive bee Apidae.

c. *Apisflorea* : The little bee Apidae.

d. *Apismellifera* : The European or Italian bee Apidae.

e. *Meliponairridipennis* : Dammar bee, stingless Meliponidae

Duties of worker (02 marks)

a.Buildcombwithwaxsecretionfromwaxglands.b.Feedtheyounglarvaewithroyaljellysecreted fromhypopharyngeal gland. c.Feedolderlarvaewithbee-bread(pollen+honey)

d. Feedingandattendingqueen. e.Feedingdrones.f.Cleaning,ventilatingandcooling thehive.

g.Guardingthehive.h.Evaporatingnectarandstoringhoney.

	SECTION "B"	**(12 Marks)**

	(Write the answers in one sentence only. Each question carries 2 marks)
Q.6	**Answer in one sentence.(Any Six)** a) Define Parasitoid with Example b) Define Factitious host c) Write important species of Pollinators. d) Define Moriculture e) Define Supersedure queen f) What is Kirilac. g) *Zygogrammabiocolorata*
Ans.	a) An insect parasite an arthropod, parasitic only in its immature stages, destroying its host in the process of its development and free living as an adult. b) An unnatural but acceptable host used in Laboratory for propogation of beneficial organisms c) Honey bees, solitary bees like *Xylocopa*, *Andrena* and *Halictus* and bumble bees, *Bombus spp.* stingless bees, *Trigona spp.,* wasps, many kinds of flies Syrphus, Bonbyliu7s andSarcophaga, beetles and moths like *Acherontia spp*. and *Deilephila spp*. d) Cultivation of mulberry for rearing silkworm is called moriculture. e) When a old queen is unable to lay sufficient eggs, she will be replaced by new queen f) It is the residue left inside cloth bag,is an another variety of refuse lac. g) Both adults and grubs are capable to feed on *Parthenium* leaves.

	SECTION "C"			**(12 Marks)**
	(Choose the correct option. Each question carry 1 mark)			
Q.7	**1) *Braconhebator*is most common**			
	a)	**Larval parasitoid**	**b)**	Pupal parasitoid
	c)	Adult parasitoid	**d)**	Egg parasitoid
	2) Royal jelly secreted in honey bee by			
	a)	Prothorasic gland	**b)**	**Hypopharyngeal gland**
	c)	Carporaallata	**d)**	Brain
	3)*Rodoliacardinalis* is introduced in India for the control of			
	a)	**Cottony cushion scale**	**b)**	Apple wooly aphid
	c)	Coconut Black headed catterpillar	**d)**	None of these
	4) Pebrine disease of Silk worm is caused by			
	a)	Bacteria	**b)**	Fungi
	c)	**Protozoa**	**d)**	Virus
	5) *Chelonus blackburni*is the			
	a)	Adult parasitoid	**b)**	Nymphal parasitoid
	c)	Larval pupal parasitoid	**d)**	**Egg larval parasitoid**

	6) Predatory stage of *Chrysoperla sp.* is

	a)	**Larval**	**b)**	Adult
	c)	Nymphal	**d)**	None of these
	7) Parachutes are made from ---------- denier silk fiber.			
	a)	12-14	**b)**	13-15
	c)	12-15	**d)**	**13-14**
	8) The process of leaving off the colony by Queen is Known as –			
	a)	Absconding	**b)**	**Swarming**
	c)	Supersedure	**d)**	Queen excluder
	9) Lac is only known commercial resin is the only product of			
	a)	**Animal origin**	**b)**	Plant origin
	c)	a and b	**d)**	None of above
	10) Muga silk is predominatly cultivated in the region			
	a)	Arunchal pradesh	**b)**	West Bengal
	c)	Rajasthan	**d)**	**Assam**
	11) Father of Modern Bee keeping in India			
	a)	**Dr. A.S. Atwal**	**b)**	L.L. Longstroth
	c)	Prof. Karn von Frisch	**d)**	None of above
	12) The insects which feed upon the dead and decaying plant and animal matter is called as			
	a)	Pollinators	**b)**	Weed killers
	c)	**Scavanger**	**d)**	None of these

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