ENTOMOLOGY



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Explore over 38 lessons delving into crucial topics in Entomology. Each lesson is packed with concise notes, oneliners, and short notes, offering a comprehensive learning experience. Additionally, you'll find over 1000 oneliners to further enhance your understanding of the subject.



Volume :- 8

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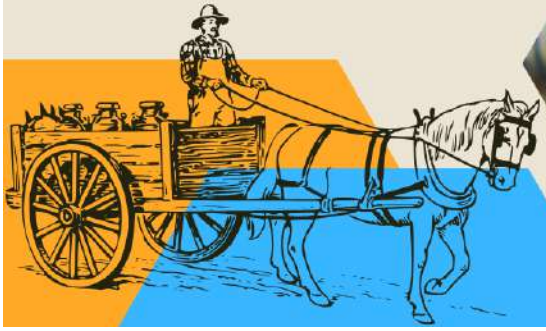




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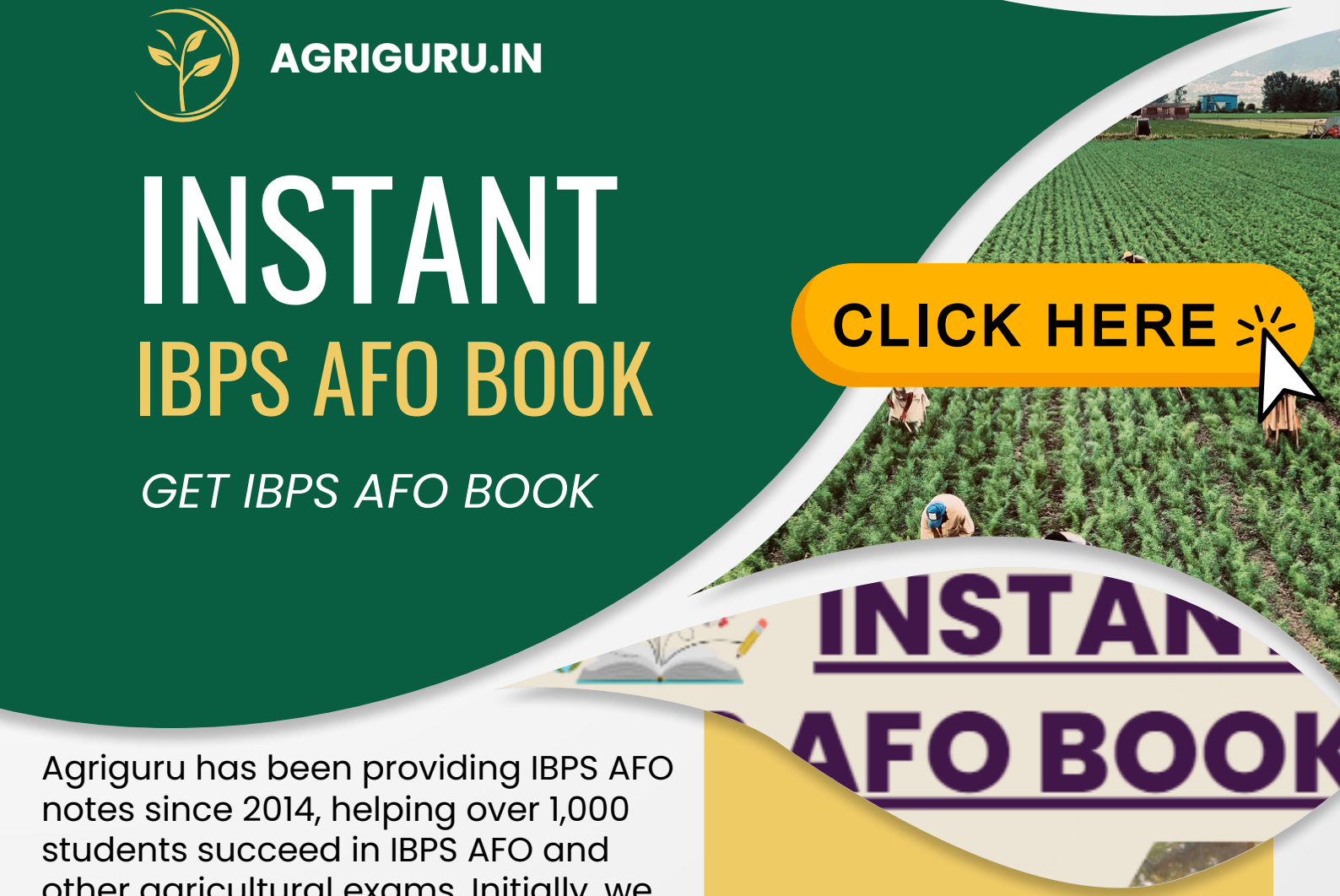
38 Entomology one liner 1000+

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ENTOMOLOGY

- The word entomology derived from Greek word:
- Entomo = Insect
- Logos = Discourse

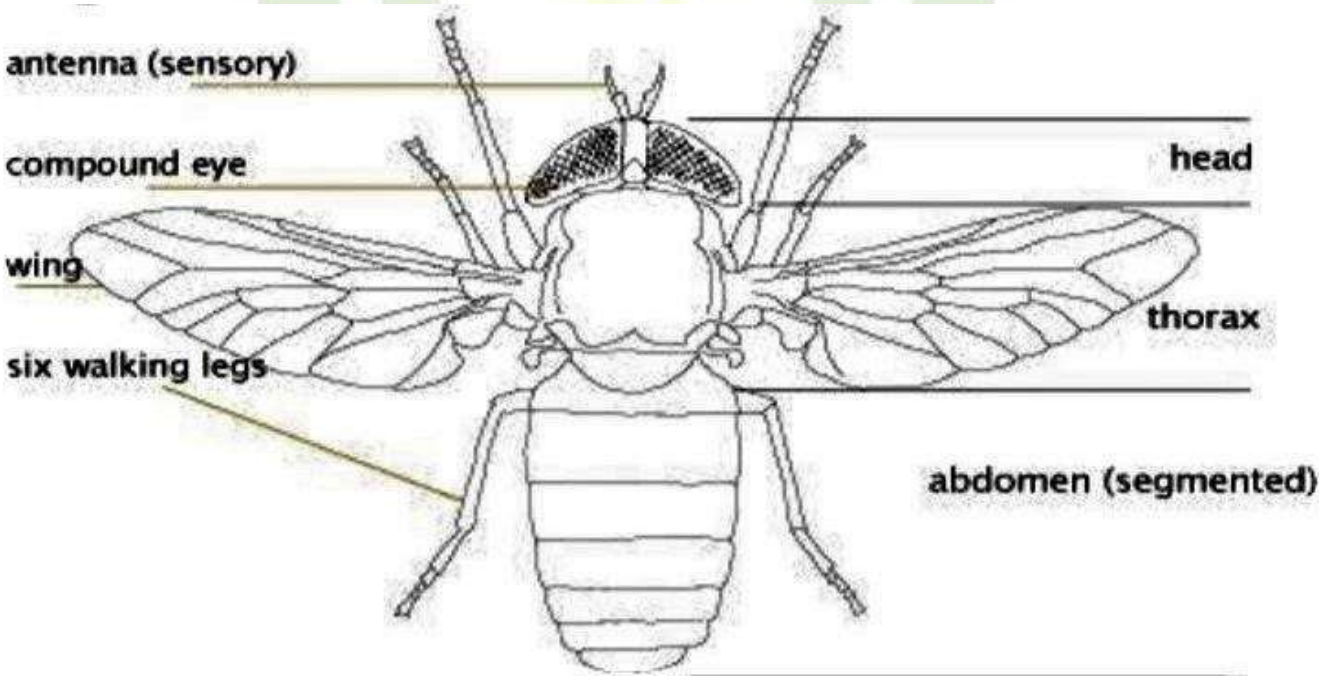
- **Classification**: According to Agricultural importance,

Phylum: Arthropoda (Greek word means Segmented legs)

Classes

Crustacea	**Arachnida***	**Myriapoda**	**Insecta***
(Crabs, Prawns)	(Spider, Mites)	(Millipedes, centipedes)	(Insects)

Insect



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Insects are tracheate arthropods divided into Head, Thorax and abdomen.

❖ Subclasses of class Insecta:

1. Apterygota (4 orders)
2. Pterygota (25 orders)

There are 29 insects order out of which Seven orders are agriculturally important e.g.

1. Hymenoptera
2. Diptera
3. Coleoptera
4. Lepidoptera
5. Thysanoptera
6. Hemiptera
7. Isoptera

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Insecta

(Subclasses)

Apterygota

Primarily wingless, metamorphosis absent or slight and Pregenital appendages present.

1. Protura (Telsonfly)
2. Diplura (Japygids)
3. Collembola (Springtails)
4. Thysanura (Silverfish)

Pterygota

Winged, metamorphosis present and pregenital abdominal appendages absent.

Exopterygota

External wing development, incomplete metamorphosis, pupa absent and immature nymphal stage present.

Order

1. Ephemeroptera (Mayflies)
2. Odonata (Dragon/Damsefly)
3. Plecoptera (Stonefly)

Endopterygota

Internal wing development, complete metamorphosis, pupa present and immature stage is larvae.

Orders

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4. Grylloblatodia (Rock crawlers)
5. Orthroptera (Grasshopper, Locust)
6. Phasmida (Stick & leaf insects)
7. Dermaptera (Earwing)
8. Embioptera (web spinners)
9. Dictyoptera (Cockroach)
10. Isoptera (Termites/White ants)
11. Zoraptera (Zorapterans)
12. Psocoptera (Book lice)
13. Mallophaga (Bird lice)
14. Siphonculata (Head, body louse)
15. Hemiptera (Bugs)
16. Thysanoptera (Thrips)

1. Lepidoptera (Butterflies, moths)
2. Coleoptera (Beetles, weevils)
3. Diptera (True fly)
4. Strepsiptera (Stylopids)
5. Neuroptera (antlions, owlflies)
6. Mecoptera (Scorpionflies)
7. Trichoptera(Caddisfly)
8. Siphonoptera (Fleas)

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- **Exopterygota** : Incomplete metamorphosis *i.e*, presence of 3 stages.
- **Endopterygota** : Complete metamorphosis *i.e*, presence of 4 stages *viz,* egg, larvae, pupa and adult

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Types of mouth parts

Types of mouth parts	Example
Biting and chewing type	Larval Lepidoptera, grasshoppers, locust, beetles
Piercing and sucking type	Mosquito, Aphids, Bugs, Leafhoppers
Sponging type	Housefly
Siphoning type	Butterfly, Moths
Chewing and lapping type	Honeybee
Rasping and sucking type	Thrips

Types of Larvae

Order	Types of larvae	Damaging stage	Example
Orthoptera	Nymph	Nymph & adult	Grasshopper, locust
Hemiptera	Nymph	Nymph & adult	Whitefly, aphids, hopper & jassids
Thysanoptera	Nymph	Nymph & adult	Thrips
Hymenoptera	Grub		Honeybee
Lepidoptera	Caterpillar	Caterpillar	Butterfly, moth

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Coleoptera	Grub	Grub and adult	beetles
Diptera	Maggot	Maggots	True flies, housefly

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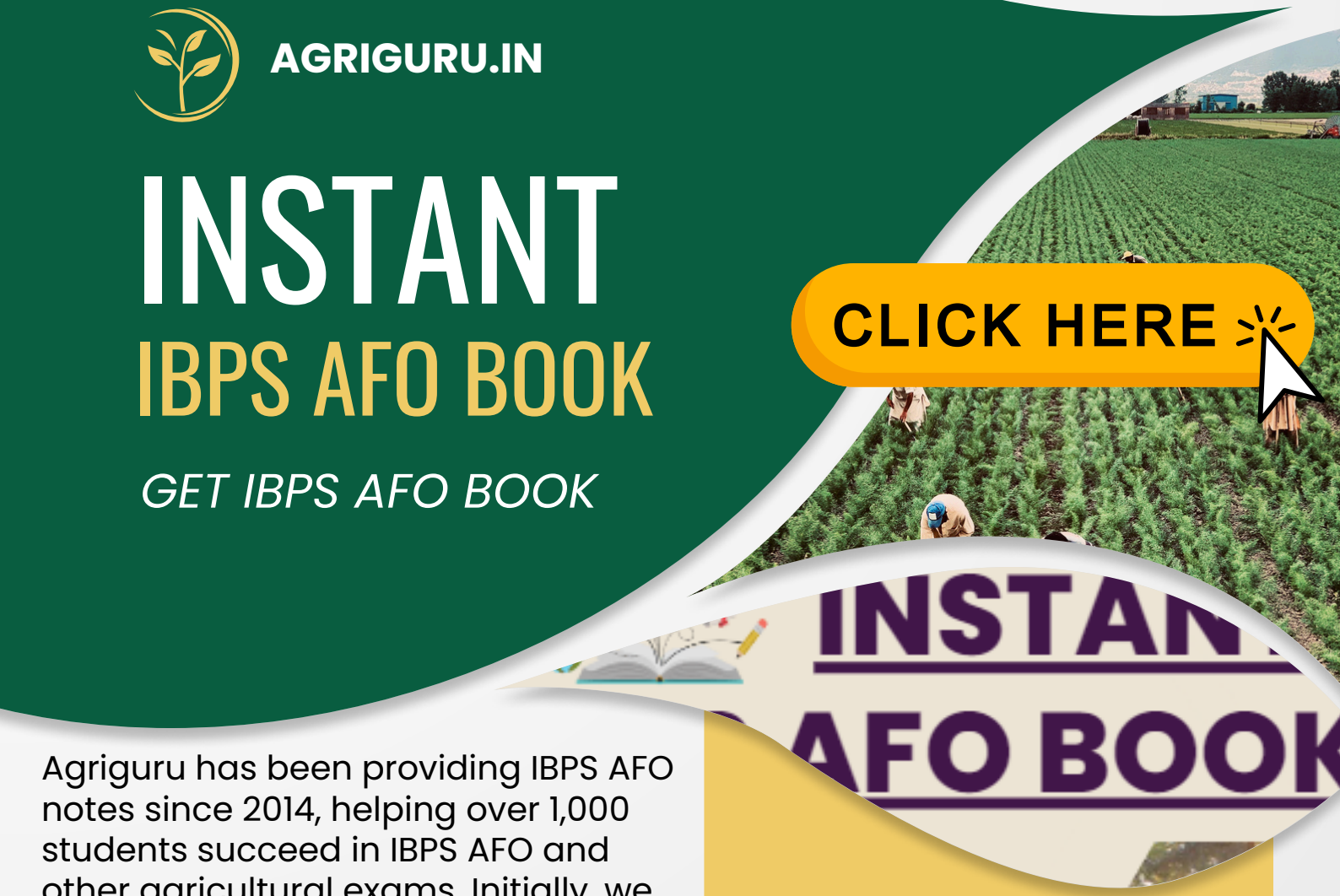
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Apiculture: Bee Flora and pollination of crops

BEE FLORA AND POLLINATION OF CROPS

- Bee visits plants for its food, nectar and pollen.
- This floral fidelity of bees is due to their preference for nectars having sugar contents and pollens with higher nutritive values.
- Besides getting food for the bees as a result of their visit pollinate a number of crops.

Qualities of honeybees which make them good pollinators

- Body covered with hairs and has structural adaptation for carrying nectar and pollen.
- Bees do not injure the plants
- Adult and larva feed on nectar and pollen which is available in plenty
- Considered as superior pollinators, since store pollen and nectar for future use
- No diapauses is observed and needs pollen throughout the year
- Body size and proboscis length is very much suitable for many crops
- Pollinate wide variety of crops
- Forage in extreme weather conditions also.

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Apiculture: Bee Flora and pollination of crops

Effect of bee pollination on crop

- It increases yield in terms of seed yield and fruit yield in many crops
- It improves quality of fruits and seeds
- Bee pollination increases oil content of seeds in sunflower
- Bee pollination is a must in some self-incompatible crops for seed set.

Crops benefited by bee pollination-

- Fruits and nuts: Almond, apple, apricot, peach, strawberry, citrus and litchi.
- Vegetable and Vegetable seed crops: Cabbage, cauliflower, carrot, coriander, cucumber, melon, onion, pumpkin, radish and turnip.
- Oil seed crops: Sunflower, Niger, Rape seed, Mustard, safflower, gingelly.
- Forage seed crops: Lucerne, clover.

Yield increase due to Bee Pollination

Crop	% yield increase

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Apiculture: Bee Flora and pollination of crops

Mustard	43
Sunflower	32-48
Cotton	17-19
Lucerne	112
Onion	93
Apple	44

Pollination by bees - case studies with selected crops

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1. Sunflower:

- It is a cross-pollinated crop.
- The pollen of the plant cannot fertilize ovary of same plant.
- Pollen source should be from different plant. Hence, honey bees acts as important agents for pollination in sunflower.
- In sunflower, yield increases even up to 600 % due to bee pollination. It improves quality and quantity of seeds.
- Oil content also increases by 6.5 % in seeds.
- To achieve this, it requires 5 strong C. indica colonies or three A. mellifera colonies. Mostly irrigated crop is preferred by bees.

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2. Cucurbitaceous vegetables:

- Cucurbits are monoecious with staminate and pistillate flowers in same plant.
- Due to bee pollination fruit set increases up to 30 to 100 %.

3. Alfalfa or Lucerne:

- These plants have tubular flowers with 5 petals joined at base.
- They possess one large standard petal, 2 smaller petals on sides and 2 keel petals holding staminal column.
- When bee sits on a keel petal, stamina column strikes against standard petal resulting in shattering of pollen. This is called tripping. Seed set occurs only if bee sits to trips the flowers.

4. Coriander:

- In coriander yield increases up to 187 % due to pollination.

5. Cardamom:

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- It is an important commercial crop depending on bees for pollination.
- Here yield increases up to 21 to 37 %.

6. Gingelly:

- Another oilseed crop where bee pollination causes 25 % increase in yield.

7.Apple:

- In apple seed set occurs only if it is pollinated by bees.
- Fruit is formed only around the seeds. If improper seed set occurs fruit shape is lopsided resulting in decreased market value.
- The following are some of the important plants either wild or cultivated visited by bees for collecting nectar or pollen or both.

8. Other fruit Trees

- **All kinds of citrus, litchi, peach, apple, guava, jamun, date palm, apricot, quince, pear, almond, plum, loquat, phalsa, and cashew.**

Cultivated field crops

- **Pigeon pea, lentils, clovers, Lucerne, mustard, rape, linseed, sesame, gingelly, buck-wheat, Cambodia, safflower, millet and sunflower.**

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Apiculture: Bee Flora and pollination of crops

Vegetables

- All cucurbitaceous plants, okra, beans, turnip, radish, onion, brinjal, and sweet potato.

Timber trees

- Neem, Cassia fistula, Acacia, Albizzia spp., Kachnar (Bauhinia purpurea), eucalyptus, sandle-wood, raintree, wild cherry.

Natural and ornamental flowers

- Cosmos, shoe flower, Golden rod, Cup & saucer, Tecoma stans, zinnia, coral creeper (Antigonon leptopus), rose, rangoon creeper, aster, wild rose (kuja), hydrangea, violet, portulaca, poinsettia, honey suckle, corn flower, coreopsis, dandelion etc.
- It is now apparent that most of the pulses and oilseeds, fruits and orchard crops including vegetables heavily depend on bees for their pollination.
- This is also true for seed production of vegetables like onion, cabbage, cauliflower, Tobacco, sun hemp, Alfa alfa and clovers.

Number of colonies of Honeybees required per hectare

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Apiculture: Bee Flora and pollination of crops

- **The number of colonies of honeybees required per hectare very much depends on the strength of foraging bees in the colony, the crops and prevailing weather conditions.**

- **The optimum number of colonies of average strength may range from 3 to 9 colonies per hectare, since the bees usually forage within a radius of about 1 to 2 km to harvest their nectar and pollen loads, and then return to their own hive.**

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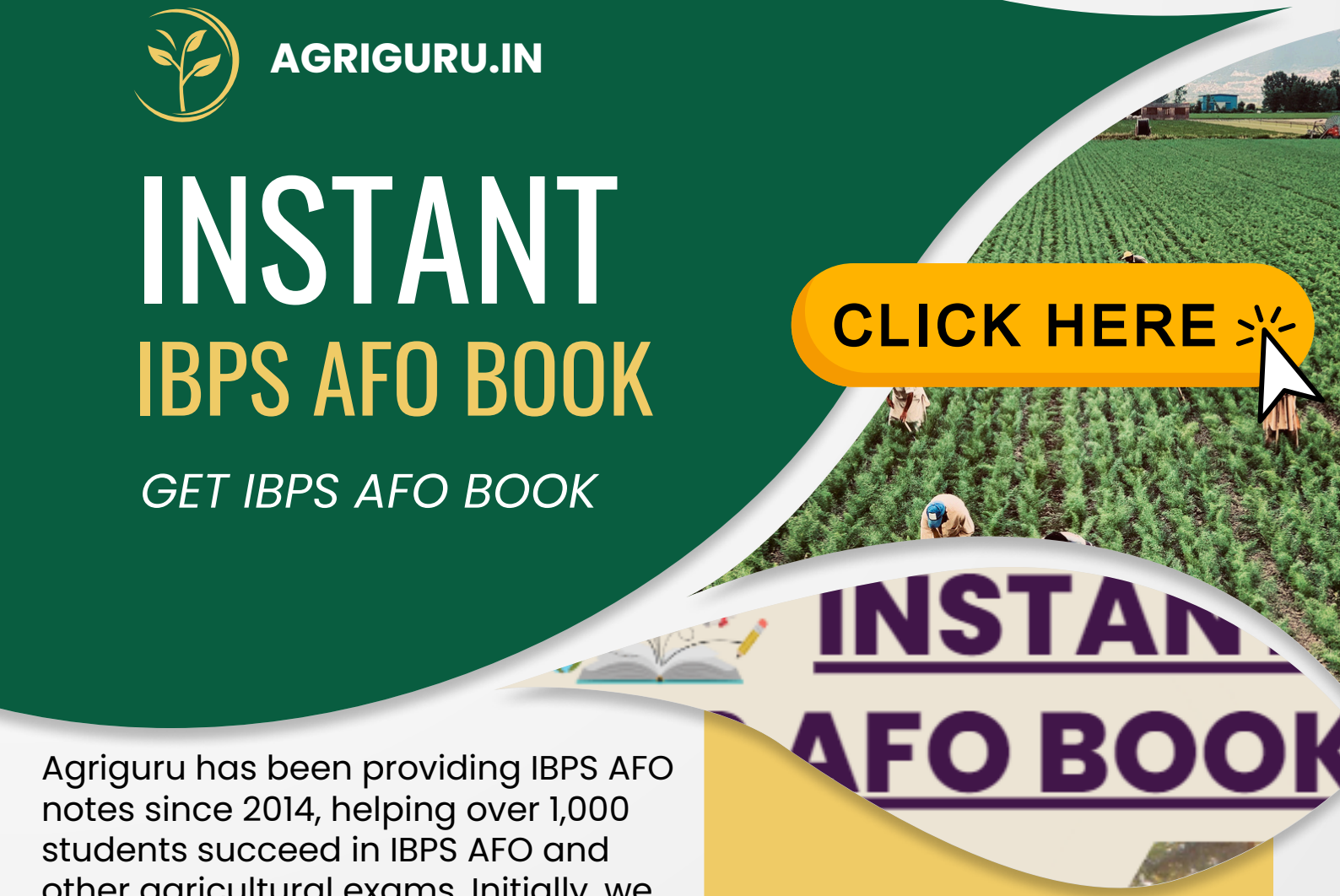
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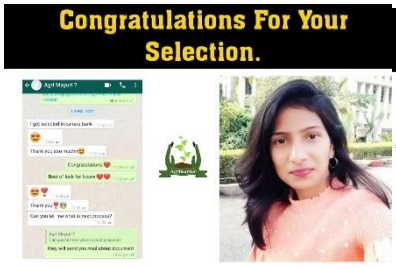
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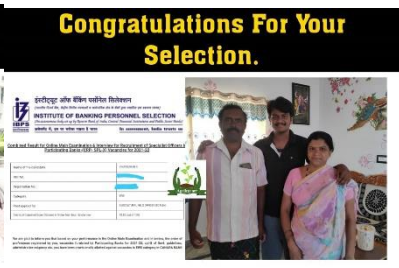
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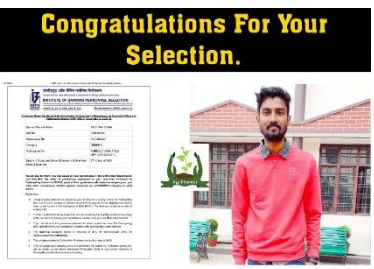
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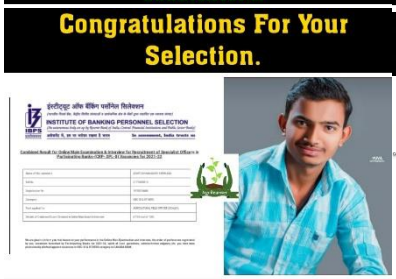
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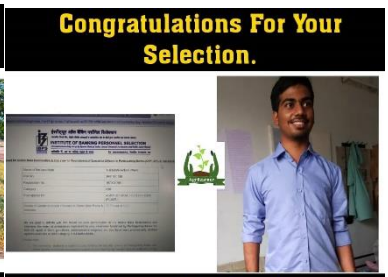






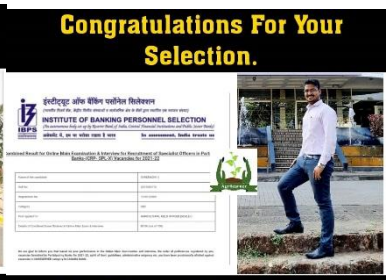


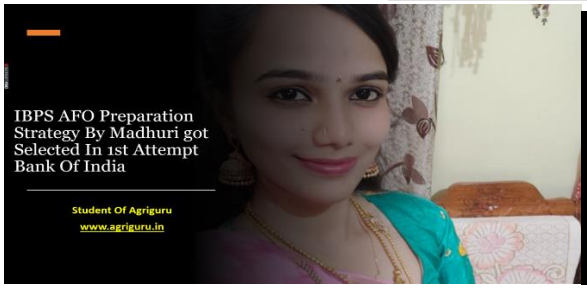


















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