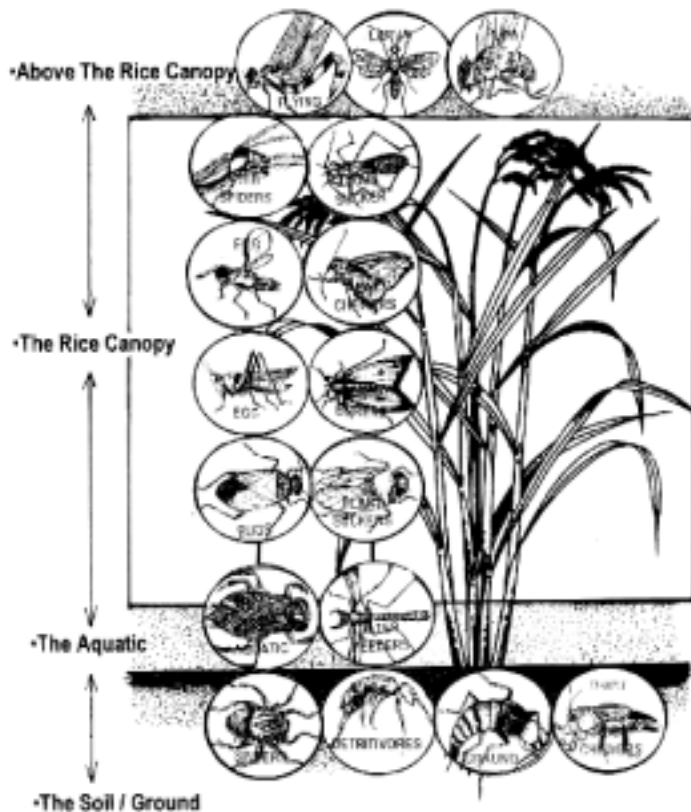


HABITAT STUDY IN RICE ECOSYSTEM



Background

In the rice field there are a number of “levels” or habitats in which insects live. One way to think of these is in terms of a vertical stratification. The top level is above the rice canopy. The second level is in the rice canopy itself. The third level is the aquatic, or water. The fourth level is the soil. Each of these habitats have different species of organisms.

Each insect has unique to it's habitat. The characteristics and function of insect are influenced by their habitat. Most insects that live in the water or soil function as natural enemies or decomposers.

All insects that live in the top level have are very dynamic and move among plot. Usually plant feeder live in the rice canopy.

Objective

We should be able to explain the different types of habitats found in a rice ecosystem and the types of organisms that live there.

Times: 120 minutes.

Materials: Flooded rice field, sweep net, plastic bags, large paper, pens, glue.

Procedures

□ Preparation

Use the following questions as discussion topics:

- How many habitats can be seen in the rice field?.
- What kind of insects can be found in each of these habitats?.
- What is the relationship between these habitats? Do they overlap and inter-relate?

□ Action

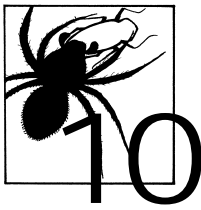
- Divide into four groups. One group should focus on one habitat.
- Have them first stand and observe their habitat. Then slowly begin to look closer.
- Collect organisms that they find in the habitat.
- Draw pictures of these organisms. Then have each group place them (the drawing) on a large piece of paper which has the rice ecosystem drawn on it with four habitats clearly defined.
- Discuss the relationship between these organisms.

□ Discussion

- What kinds of insects/spiders were found in each habitat?
- Are the organisms in one habitat related to another? Do insects change their habitat during their life cycles?
- How does the energy cycle relate to these habitats and organisms?

□ Follow up

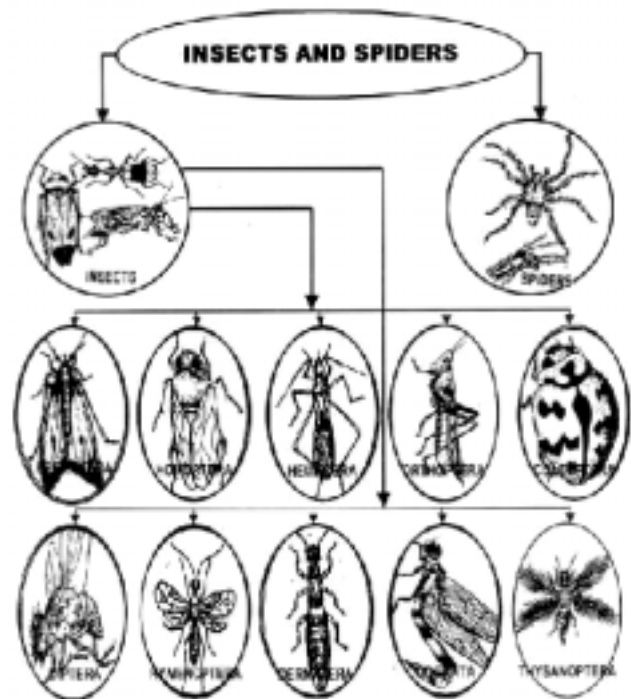
- Continue to observe the ecosystem, concentrating on each habitat. Identify the functions of the organisms that were found.



INSECT IDENTIFICATION AND DRAWING EXERCISE

Background

When we do an AESA, we draw all of the ecosystem components. The problem is that we need a long time to draw insects which reduces the time for analysis, the purpose of AESA. Drawing in an AESA is not for art but to help us analyze the ecosystem. Insects can be drawn more accurately and more quickly if you know the classification of the insect. A pattern can be used for each insect order to help draw it quickly and accurately.



Objective

We should be able identify an insect based on order classification and draw it quickly and accurately for easy analysis.

Times: 120 Minutes.

Materials: Insect collection, large paper, pen, ruler.

Procedures

□ Preparation

- Start the discussion by asking:
 - What the problems do we encounter when we draw insects in the AESA?
 - What are the distinguishing characteristics between insects and spiders?
 - How are the order names of insects related to wing types?
- Look at the insect samples and identify their order based on their wing types.
- Give examples of insects to draw based on wing type. Go through each one step by step. Use the examples of coleoptera, hemiptera and homoptera.

□ Action

- Try to draw the insect orders. Identify the insects based on their wing characteristics. Classify them by order. Look at their mouth parts. List a number of common insect types by their order.

Order	Examples	Life Cycle	Mouth Type

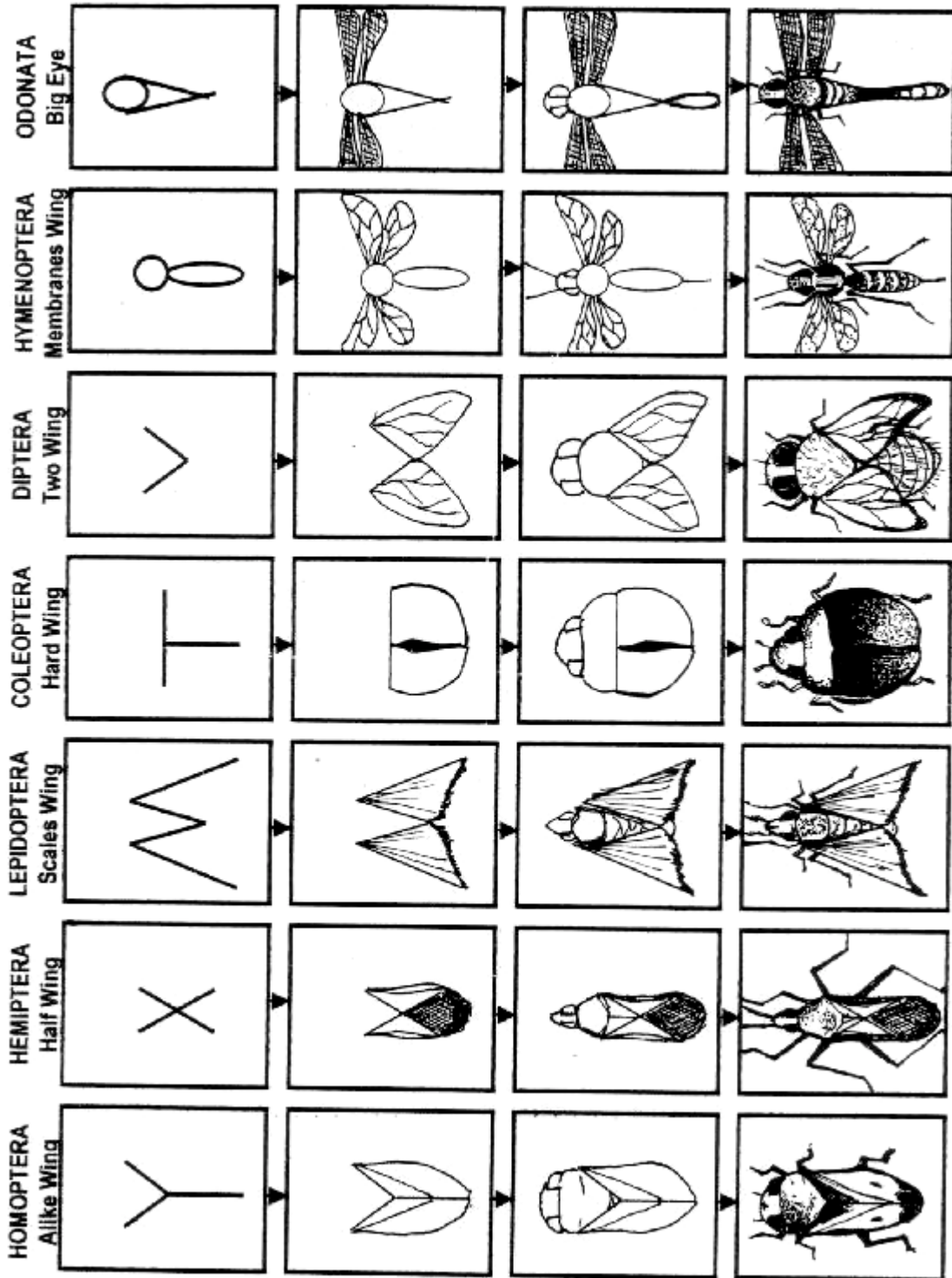
□ Discussion

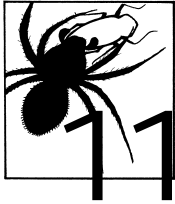
- In which order are most plant feeders?
- In which order are most predators?
- In which order are most parasites?
- Are there exceptions to these? Are function and order the same?

□ Follow up

- Closely observe the mouth types of various types of insects based on their function.
- Use a microscope.

PROCEDURE OF DRAWING INSECTS



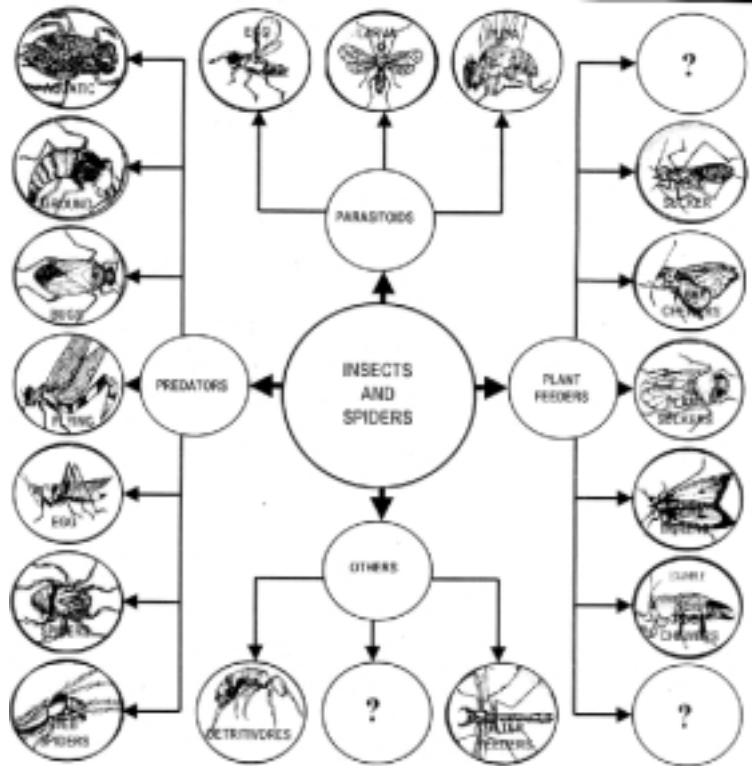


FUNCTIONAL GROUPS OF INSECTS AND SPIDERS IN THE RICE ECOSYSTEM

Background

During the planting season, we can find more than 500 species of insects in the field. It's very difficult to identify each species of insect. To make it easy to identify insects, however, we can classify insects by "functional group". This means we can divide insects based on their function in the ecosystem.

This grouping into "functional groups" allows us to talk in greater detail about the system, and in a way that is clear and logical to farmers, without getting lost in all the details of working with hundreds species.



Objective

We should be able to identify the functional group of the specimens that we find in the rice field.

Times: 120 minutes.

Materials: Insects and spiders collected from the field, large papers, pen, ruler.

Procedures

□ Preparation

Start the discussion by asking:

- What are the problem in identifying the large number of species of insects and spiders in the rice ecosystem?.
- What is the meaning of a “functional group” , or “Guild”?
- Make a format of functional groups on the large paper (see sample above)

□ Action

- Put in the center of the piece of papers all of the insects and spiders that we have collected from the rice field.
- The specimens can be divided into 4 groups based on their function; (*Plant feeder, Predator, Parasite and neutral*)
 - The plant feeder group can be divided into several small groups, based on which a part of the plant is damaged by the insect.
 - The predator group can be divided into several small groups, based on where they live in the rice field, their specific prey, and in the part of the prey's life cycle, that they are feed upon by the predator.
 - The parasite group can be divided into small groups based on what part of the host's life cycle they attack (egg, larvae, pupae, adult).
 - The neutral group can be divided into 2 small groups based on food sources (organic matter and plankton/algae).
(See sample on the previous page)

□ Discussion

- How useful is this method of insect identification based on functional groups?
- Were some insects in more than one group? Could you find the functional group for every insect?
- How can you find the functional group for those you don't know? Do you have any suggestions for additional functional groups? What are they?
- What can we do to help farmers identify insects in their fields? Are neutral insects really neutral?

□ Follow up

- Continue to identify insects at each stage of the rice plant growth.
- While the IPM training going on, collect insects and spiders the were found in the rice field.
- Hang the insect collections on the format after we identified their function. (the format like as below)

**INSECT POPULATION DYNAMIC
IN LONG SEASON RICE GROWTH**

				PARA SITES				PREDATORS				PLANT FEEDERS				NEUTRAL INSECTS				Fallow Field	
				?				?				?				?				Last Season	
				?				?				?				?					
				?				?				?				?					
				?				?				?				?					
				?				?				?				?					
				?				?				?				?					
				?				?				?				?				Fallow Field	
PARA SITES				PREDATORS				PLANT FEEDERS				NEUTRAL INSECTS				Fallow Field					