

Menu for Children.

Feeding times for children should generally be those mentioned for brain workers. They should be given a cup of milk or one egg and soya bean coffee extra at 4 P. M.

Directions.

1. The above are only specimen menus. Many other preparations and combinations of foods can be substituted for those recommended above provided they are done in keeping with the advice given in the pamphlet on 'Balanced Diets'. The meals recommended for morning and evening are interchangeable. Where whole milk is cheap i. e., one anna and a half a lb., it should be used instead of skim milk and butter.
2. In the case of those taking the minimum cost diet 'Broken Rice' should be understood wherever 'Rice' is mentioned.
3. 'Kitchri' is usually made of rice and either tur dal or masoor dal (2 parts of rice and one of pulse).
4. Malted Jowar:—About 6 ounces of jowar should be malted and used in one week.
5. 'Rotis' are to be prepared of *mixed flour* of the following ingredients except bran. They should be mixed in the following proportion and sent to the local mill. Fresh bran should be added to the flour twice a week.

Malted jowar about 15 per cent.	Malted jowar	about 15 per cent.
Soya beans " 20 "	or Soya beans	" 25 "
Bran " 15 "	Bran	" 10 "
Wheat " 50 "	Rice, bajri, or jowar	" 50 "
6. 'Usal' is a cooked and spiced preparation of sprouted pulse seeds.
7. Soya Bean Coffee:—The beans are roasted like coffee beans and ground to a fine powder for use.
8. Some of the ground-nut cake should be used for chutnee and the rest should be mixed with dal, curries or 'usal'.
9. Salad:—Tomato, yellow carrots, cucumber, raddish, onion, cabbage etc., and some leafy vegetables can be used uncooked. Clean them in cold water and then in hot water so as to remove dirt and destroy insects etc., cut to pieces and add curds and condiments to taste. Sprouted horse grams should be used uncooked with or without the addition of salads given above.
10. Skim Milk Curds:—Churn the milk powder in water (1:9) and boil for five minutes. Prepare its curds just as you do of ordinary milk.
11. Lunches should be home-made and should be taken to the office or factory in a tiffin carrier.

(The Bombay Presidency Baby and Health Week Association).

Review.

Indian Forest Records: (New Series). *Entomology*: Vol. I., No. 6., "On the Biology of the Braconidae", pp. 105—138 (1935); No. 8., "On the Biology of the Ichneumonidae", pp. 151—168 (1935); No. 9., "On the Biology of the Tachinidae", pp. 169—184 (1935). By C. F. C. Beeson and N. C. Chatterjee. Messrs. Beeson and Chatterjee of the Forest Research Institute, Dehra Dun have done a distinct service in the cause of biological control in bringing to light the parasitic fauna on some important forest insects chiefly forest defoliators and borers, mostly Lepidopterous and Coleopterous ones. These parasites must be studied in conjunction with a paper on "The Biological Control of Teak Defoliators" by C. F. C. Beeson (Indian Forester, Vol. 60, pp. 672—683, October 1934), wherein the author discusses the theory of biological control in connection with the two teak defoliators

Hyblaea puera and *Hapalia machaeralis*; and in this contribution he makes a reference to his making a survey of the distribution of parasites and predators of teak insects.

A survey of the insect parasites is essential so that it may give one an idea as to the regions where they are abundant and places where either they are found in small numbers or completely absent. And this in its turn would afford a working knowledge as to the introduction of particular parasites into regions where they are absent. Therefore it is that even before one thinks of biological control, it is incumbent upon him to ascertain the parasitic fauna present in the different regions. And towards this end the authors have recorded in these three numbers the Braconid and Ichneumonids among the Hymenoptera and the Tachinids among the Diptera.

In the words of the authors the objects of the studies are: "a) to ascertain the composition and sequence of parasitism of the chief defoliators of trees such as teak, sal, shisham; and b) to determine the relative importance of parasites and other factors in the natural control of borers of timbers."

The treatment is similar in all the three cases. Each number begins with an abstract wherein the parasites and their hosts are cited. Then follows a foreword in which are given the implications of biological control in relation to the different parasites parasitic on the different hosts. The distribution of parasites and their hyperparasites is given regionally—the different regions being: I. the north-west region comprising Dehra Dun; II. the central region represented by Hosangabad, Central Provinces and parts of Orissa; III. the southern region represented by Nilambur plantations, Madras and South Coorg; and IV. the eastern region comprising records from Bengal, Burma and the Malaya Peninsula.

The authors bring about the import of the following aspects of biological control by a study of the regional distribution of the parasites and their hyperparasites:

- i. the distribution of these parasites and their hyperparasites is very irregular and uneven;
- ii. the irregular distribution in its turn makes biological control easy as it gives an idea as to where they are abundant and where absent, thereby making the "introduction and establishment of useful parasites in regions where they are at present absent" easy;
- iii. it also gives an idea as to the presence or absence of the hyperparasites on which the failure or success of the introduction of new parasites depends;
- iv. in some cases the authors have recorded them to be present even in Europe, thereby making it evident that the distribution is still wider;
- v. by noting down the distribution, one is able to find out the factors responsible for any variation in the degree of incidence.

In the body of the paper the parasites are arranged in an alphabetical order with available notes on their hosts, distribution and bionomics.

Among the Braconids seventy species are recorded as being parasitic on "a) *Hapalia machaeralis* and *Hyblaea puera*; b) on *Dinoderus* boring bamboo, or *Lyctus* and other *Bostrychids* boring dry wood; c) parasites of various other defoliators; d) of *Curculionid* and *Cerambycid* wood borers."

The following may be said to be important from an agricultural aspect: *Apanteles glomeratus* on *Pieris brassicae*, L. feeding on cabbage and mustard; *Apanteles obliquae* Wlkn., on *Amsacta* sp.; *Apanteles papilionis* Vier., on species of *Papilio* feeding on citrus; *Apanteles ruficrus* Hal., on *Spodoptera mauritia* Boisd., and *Microplitis maculipennis* Szep., on the castor semilooper *Achaea janata* Linn.

Fifty species are recorded among the Ichneumids of which ten species are parasitic on the teak defoliators *Hapalia machaeralis* and *Hyblaea pueria* Cram., with seven species of hyperparasites on the parasites of the teak defoliators; and a number of species of *Henicospilus* being primary parasites of Lymantridae. In addition, several species *Diocetes*, *Cremastus* etc., are also recorded. Of these the following are agriculturally important e. g., *Charops erythrogaster* Ashm., on *Achaea janata*, L., a pest of *Ricinus communis*, and *Eupterotis* sp.; *Cremastus flavo-orbitalis* Cam., on *Antigastra catalaunalis* Dup., feeding on *Sesamum indicum*, *Chilo simplex* Butl., a borer of rice, cholam etc., *Euzophora peticella* Rag., a borer of the shoots of Brinjal, tomato, chilli etc., *Leucinodes orbonalis* Guen., a borer of the shoot of brinjal and potato; *Diocetes argentipilosa* Cam., on *Laphygma exigua* Guen., a cosmopolitan feeder on agricultural crops especially in the earlier stages; *Melcha nursei* Cam., on *Earias fabia* Stoll., *Earias insulana* Boisid., the two cotton bollworms, and *Plusia orichalcea* F.; *Microtoridea lissonota* Vier and *Neopimploides syleptae* Vier., on *Sylepta derogata* F. the common cotton leaf roller.

Now among the Tachinids forty-one species have been mentioned and the authors state "that several species of European Tachinidae have been reared from hosts in Indian region." Among the agriculturally important are *Erycia nymphalidophaga* Bar., on *Papilio demoleus* L., feeding on citrus; *Ptychomyia remota* Aldr., feeding on cotton; *Sturmia inconspicua* Bar., on *Spodoptera mauritia* Boisid.; *Sturmia sericariae* Corn on *Papilio demoleus* L.

From these it can be seen that the parasitic fauna of forest insects are also important to an agricultural entomologist as the former are also parasitic on insect pests of agricultural crops. Therefore a study of the parasites in both cases is important because the two are woven together. And the importance of it is all the more in effecting biological control for one gets a wider scope for breeding parasites, which have got a number of hosts, for improving the rearing technique; in view of the presence of large number of hosts, it is possible that the parasites may be had in abundance right through the year on one host or another; and lastly their wide distribution gives ample scope for studying the factors responsible for their increase or decrease in the course of the year. In order that biological control may be successful, two points are essential viz., overlapping of generations in the case of the host so that the parasite may have the right stages for parasitising at all times; and the presence of a number of alternate hosts for the parasite so that they may be had right through the year. The latter is fulfilled by distributional studies.

Among the Braconids are mentioned species of the genus *Spathius*. A species of this genus also appears to attack the stem weevil of cotton viz., *Fempheres affinis* F., in South India, though only to a very negligible extent in nature. But it appears to be parasitic on the Bostrychids that attack the dried up cotton stalks which are dead on account of *Pempheres*. Therefore, if one comes across the correct host, then it is easy to get in at the alternate hosts of the parasite. For, in this case, species of *Spathius* are recorded as parasitic on the several Bostrychids, Scolytids and Curculionids. Thus breeding of the parasites right through the year is facilitated.

Therefore it is essential that a study of the parasites of insect pests of agricultural crops be done along the lines shown by the Forest Entomologist in these numbers. And this will go a long way in broadening our outlook with regard to control by natural enemies, instead of restricting ourselves to mere agricultural crops. The importance of a study of both is well exemplified in these numbers and the authors have given an impetus as it were, towards the mode of studying the parasitic fauna.

V. M.