



FACULTY OF AGRICULTURAL SCIENCES & ALLIED INDUSTRIES

ENT -321 Management of Beneficial Insects 2 (1+1)

Lecture-10 Nutritional Requirements of Silkworm:

The food of silkworm must contain all the necessary elements for the development of the silkworm, especially for the metamorphosis. The quality of the food adversely affects the silk secretion and reproduction. The quality of mulberry leaf has a great influence on the amount ingested. Not only the physio chemical characteristics in relation to the age of the leaf but also the characteristics of the mulberry varieties, affect the amount ingested, so that qualitative underfeeding is always linked with the quantitative under feeding. Silkworm nutrition includes organic and inorganic substances, amino acids, and variation of composition with the age of the silkworm or with the age of the leaf.

Vitamin A: Vitamin A is effect is noted on silkworm eggs and tissues. The carotenoids of the leaves are decomposed by enzymes in the digestive tube into carotene and xanthophylls. Provitamin A so formed is changed into Vitamin A in the blood.

Vitamin C: Silk gland itself is very rich in vitamin C. The content of vitamin C increases from the egg to young larvae and to fifth instar larvae. Variations in the ascorbic acid ingested were noticed with the development of various organs. Vitamin C is synthesized, during the pupal stage, in the fat tissue as a result of the dehydrogenation of mannose.

Vitamin B2: Spraying silkworm larvae and pupae with vitamin B2, in aqueous solution, increases the percentage of protein in the insects while the fat content decreases or remains the same.

Vitamin B12: The vitamin B12 content in *Bombyx mori* changes according to the stage of development. It is maximum in the larvae, minimum in the eggs and organs, is greatest in the Malpighian tubules. Synthesis of cobalamine could be realized through *Actinomyces* in the digestive tube. Supplementation of mulberry leaves with vitamin B12 increase the protide content of the larvae but not the silk production.

Nicotinic acid: Except for a small quantity synthesized by the intestine flora, the greater part of the required nicotinic acid is obtained by the silkworm from the mulberry leaves as is the case with tryptophan. If mulberry leaves are supplemented with nicotamide, there is no protogynous effect on the occurrence of the moults. However, high doses of nicotamide given to young silkworms cause loss of appetite and failure to develop normally. Mulberry leaves treated with amino acids such as methionine and tryptophan significantly increased the fecundity, fertility, adult emergence, developmental periods and longevity of *B. mori* adults, but decreased the mortality.

In silkworms the abundance of potassium is more compared to sodium. In silkworm hemolymph the ratio of Na/ K = 0.35 and pupa contains no sodium. The source of sodium is

food. Potassium has influence on determining the voltinism and it directly affects the egg cells in the process of development. Sodium and potassium ions act on protein synthesis.