



Research Paper

**STUDY ON THE NYMPHS OF *Aiolopus thalassinus thalassinus*
(OEDIPODINAE: ORTHOPTERA; ACRIDIAE) FROM DISTRICT DADU
SINDH**

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Abstract

The genus *Aiolopus thalassinus* serve as one of the most remarkable member of the order orthoptera, *Aiolopus thalassinus* is stated as a major pest of rice, sugar cane, wheat, maize & alfa alfa . *A. thalassinus thalassinus* have polyvoltine breeding cycle throughout the year. Present study focus on the nymphal stages of this crucial pest from various localities of district Dadu, Sindh.

Key words: Orthoptera, pest, polyvoltine, nymphal instars.

INTRODUCTION

Aiolopus thalassinus thalassinus Grasshoppers are largely phytophagous insects, they have been broad studies on food selection in grasshoppers and these have been adequately reviewed by Uvarov (1966) and Chapman (1990). This genus was put up by Fieber in 1853.

Aiolopus thalassinus thalassinus (grasshoppers) are polyphagous, meaning they feed on selectively on plants from demonstrated at the species, population and individual levels (Sword and Dopman, 1999; Chapman, 1990; Chapman and Sword, 1997) provide reviews of host plant use and the relative extent of polyphagy in grasshoppers. Species of the genus *Aiolopus* are considered as pests of rice, sugarance, wheat and other crops. For the past century the genus *Aiolopus* has been a source of anxiety to acridid taxonomists. Chesler (1938) studied the life history and described the immature stages of *Aiolopus thalassinus*. *A.thalassinus thalassinus* is one of the serious pest and well delivered all around the year in Sindh including Dadu District. Bhambro (2003) studies on *A. thalassinus thalassinus* in upper Sindh worst hit areas were kashmore, Jacobabad ,

Larkana districts and various Taulka of Dadu district, as well as in Jafferabad district of Nasirabad Division. This kind of species carry superior position in Sindh.

Nymphs of this species are more active than adults and feed on short grasses and seedlings of recent crops. No any particular work on the nymphal instars of this species have been done except the work of Baloch (1978) and F.Soomro et.al (2015), she described immature stages of *A.thalasssinus thalasssinus* from several distirct of Sindh.

MATERIALS AND METHODS

The hoppers used in the present study were collected from various agricultural fields of District Dadu, Sindh such as millet, barseem, rice, wheat, vegetables and grasses from selected localities of district Dadu. Collection was made in the year 2016. Every day fresh food has been given to the hoppers. To rectify the duration and number of hoppers in the laboratory, the freshly hoppers bring up singly in Jam jar. Every jar has given seprate number. For the killing and conservation of hoppers procedure described by Vickery & Keven(1983) & Riffat & wagan (2012) was adopted.. The body parts of the hoopers were measured with Vernier caliper except first instar, frst instar and antennae of were measured by micrometer and to conclude the number of antennal segements binocular microscope was operated. To get a look of population density of hoppers on their aliveness ratio various cages of same size were taken and hoppers were kept in these cages and they were served balanced food, ie millet, alfalfa, rice etc. on each day observation were taken and dead hoppers were distanted from the cages and figure of moulted hoppers also noted.



Lab work



Field Collection

RESULTS

Numbers of nymphal instars

Several hoppers shortly were put in jam jar at room temperature, they were procured alfalfa, millets, rice paddy to feed on. Six nymphal instars were driven and the mean nymphal duration are noted reared in the laboratory at a constant temperature of 25⁰ C in Table # 01

Table # 01 Duration of Various nymphal instars of *A. thalassinus thalassinus*

Stage	Numbers of hoppers	Average Duarion (in days)	Range	
			Minumum	Maximum
First instar	65	5,5	3	8
Second instar	30	5,2	4	7
Third instar	25	5,8	4	8
Fourth instar	20	6,4	4	8
Fifth Instar	14	7,4	4	9
Sixth instar	10	8,3	6	9
Duarion of entire nymphal lifes			25	49

On investigation of Table 01 it could be witnesses the average duration of first, second a third instar was 5,5;5,2 and 5,8 days respectively and average duration of 4th ,5th was 6,4 and 7,4 days respectively and last nymphal instar took the longest period of 8,3 to become adult.

Likewise several individual alterations in duartion of moulting of hopper were examained. Majority of them could not complete the life cycle. Just 08 percent survived.However, the survivor also exhibit wide variation in the duration of their life.some of hoppers aquire minimum period Of 25 days and maximum period of 49 days to fullfil the nymphal life.

Cheslar (1938) and Dovnar-zalpol'skii (1926) had also ascertained that number of nymphal instars to eb five in both sexes of this species. Joyce (1952) stated that *Aiolopus savignyi* perceive five instars in both sexes..In some short hornrd grasshoppers is wide variation in nymphal instars for instance in *Chrotogonus robertsi* the number of instars in male was five to six and in female five to seven described by (Latif & Haq,1951)

Chesler (1938) noted that the total incubation period needed to complete the life cycle and obtained wings was 64 days,merley in the present work it varied from 25 to 49 days.The cause of this variation may be the effect of tempature ,food and other envirrmental factors.

Table 2: Nymphal instars

Month & Year	1 st	2 nd	3 rd	4 th	5 th	6 th	Total Nymphs
Jan 2016	00	00	00	00	00	00	00
Feb 2016	00	00	00	00	00	00	00
March 2016	07	12	05	10	20	24	78
April 2016	10	15	12	14	14	24	89
May 2016	18	13	16	22	20	20	109
Jun 2016	29	21	24	25	27	27	153
Jul 2016	27	30	32	32	35	32	188
Aug 2016	28	26	37	28	30	42	191
Sep 2016	20	22	28	30	34	39	173
Oct 2016	20	25	25	29	20	20	139
Nov 2016	13	13	18	19	22	16	101
Dec 2016	00	00	00	00	00	00	00
Total	172	177	197	209	222	244	1221

From Table 2 it could be seen that total population of nymphs was highest during summer months ,such as 191,188,173and 153 collection of hoppers during ,August, July,September and June respectively and lowest was 78,89 and 101 hopper population during March ,April and November severally.No nymphal population was found in the month of sevrve cold such as December,January and Febuary 2016.

The experimental results reflects that the lower temperature of winter months irresoluted the frame up of grasshoppers population while the high temperature of summer season bucked up it. Because lower temperatures prolong and higher temperature minimized the incubation period. In the mean time a natural impermanency of some insects may occur which might eliminate the population.Besides the eggs inubated at 14° C and 16° C could not hatch (Baloch & Somro ,1976) which indicates that there was no addition of individuals to the population and hence the population of this species's hoppers was higher in hot weather (summer) and lower in cold weather (winter).

Morphological superscription of assorted instars of *A. thalassinus thalassinus*

First Instar

Eyes grey, brown barking around the head and antenna filiform with elven segments. Body color brownish with grey dots on the head and thorax region. Mandibles at the edge black and brown at the base. Long regularly arranged dark dots along the anterior and posterior edges of pronotum and the posterior edges of meso and meta thorax. Brown or black dots on pro-and mesothoartic legs. Pronotum slightly convex on anterior side. Two lines with dark brown dots running throughout the either sides of the abdomen to the last segment.

Second Instar

Eyes dark grey, antenna 13-14 segments. Pronotum almost covering mesonotum & raised towards median carinae metazoan much raised than prozona. The rounded and extended lateral sides of pronotum constructing the wing pads with pale in colour.

Third Instar

Eyes dark grey to slightly brown, a whitish band appears medially dorsally from thorax up to the abdomen. Antenna with 16-19 segments. Body with brownish appearance. Pronotum raised at median carinae. Femur without transverse band and basal joint of

tibia with grey black spots. Valves of ovipositors are separated. Dark brownish bands and mark on hind femur and black marking on both sides of hind femur.

Fourth Instar

Eyes dark brownish, metathorax slightly rounded posteriorly and curved concavely at posterior lateral side. Antenna with 18-19 segments in male & 20-21 in females. Greenish dots on the body appears more prominently. Pronotum with median carinae but not raised. Wing rudiments developed. The longitudinal veins of forewing prominent, tegminal rudiment leaf shaped. The ridges surrounding the tympanum differentiated. Tegmina up to first tegnum or slightly crossing, wing pads with light greyish colour.

Fifth Instar

Eyes greyish brown in colour, antenna with 21-22 segments in males & 22-23 in females. Dark brown dots on the thorax and grey spots are on the body. Females larger in size than males. Wing rudiments spreading to the fifth abdominal segment. Pronotum fully flat, wing pads with light grey or without any colour, femur developed with grey bands, valves of ovipositors are not fully mature or differentiated.

Sixth Instar

Eyes are compound & brown in colour, antenna with 23-24 in males and 24-26 in females. Head and lower mouth parts appears in brown colour and no dark colouration appeared. Brownish, greyish bands appeared on body and arranged in parallel manner. Pronotum with median carinae and obtusely angular posterior margin dark spots. Wing pads with grey colour in brown form and in green form wing pads are without any colour. Femur fully developed with sharp median carinae. Tibia with basal and distal grey colouration with 10-11 black tip spines.

SUMMARY/DISCUSSION

Studies on the biology of *Aiolopus thalassinus thalassinus* were carried out in the laboratory of the Advanced Entomology in University of Sindh Jamshoro and in the Zoology lab of the Govt. (Ustad Bukhari) Degree College Dadu. Total six nymphal instars in both sexes of this species has been recorded. The rate of development in both male and female was normally 5,5; 5,2; 5,8; 6,4; 7,4; 8,3; days for first, second, third, fourth, fifth

and sixth instars respectively. The total minimum period of hopper development was fixed to be 25 and maximum was 49 days in laboratory condition

Total population of nymphs was highest during summer months, such as 191, 188, 173 and 153 collection of hoppers during August, July, September and June respectively and lowest was 78, 89 and 101 hopper population during March, April and November severally. No nymphal population was found in the month of severe cold such as December, January and February 2016. Mortality percentage of hoppers increased with an increase in their population density.



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