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Some laboratory studies on freshwater snails and the effect of some plants on their biological control in Beni-Suef governorate

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Freshwater snails collected from ditch like ponds near the River Nile in Beni-Suef Governorate during three climatically differed periods. *Lymnaea cailliaudi*, *Biomphalaria alexandarina*, *Bulinus truncatus*, *Lanistes carinatus, Cleopatra bulimoids*,*Physa acuta*, *Viviparus viviparus*, *Melania tuberclata* and *Bivalve*s species were included. The total number of collected snails in December 2008, March 2009 and July 2009 were 1321, 1370 and 1211 respectively, with larger number in Marsh than in July or December due to optimal climatic conditions in Marsh for most of collected snails. The recorded survival longevity in the laboratory was more than 90 days for *Lymnaea cailliaudi*, two months for *Lanistes carinatus*, while in *Melania tuberclata*, was about three weeks but only two to three days for *Bivalves*. Cercariae shedding observed from *Lymnaea*, *Lanistes* and *Biomphalaria* species beside stylet cecariae from *Lymnaea* and *Lanistes* snails, also rediae and sporocysts were found in crushed snails in all periods of collections with little difference between these periods, about 14% of crushed *Lymnaea* were containing rediae. Aquatic insects and their larvae were found especially water bug *Sphaerodema* sp. found predating snails or their eggs, also the mature insect still alive in the breeding container all over the period of the experiment more than three months. Culex larvae attacked egg masses of the snails, estacosa predated the snails while *Telapia nilotica* fishes showed low affinity to predate such snails. The oleo-gum resin Myrrh (Commiphora molmol) in the concentration of 0. 5gm/1 litre water killed 90 % of the exposed snails after 72 hours.

Great losses in animal wealth and harm effects in human due to snail transmitted parasites performing a necessary need to do further studies on such snails. Fasciolaisis represents the most wide spreading parasitic disease in ruminants, and also as stated by Haridy *et al.,* (1999) affects human welfare in Egypt. The invertebrate host snail possessing an important item in completing life cycle of *Fasciola* sp. (Boray, 1969), so cutting of this cycle needs more information about the snail's ecology, natural eminent and limiting of their spreading. Though molluscicidal researches have made considerable advance in the control of snail vectors of the major human trematodes, there is still need for molluscicides which can be obtained from local plants. The synthetic molluscicides are not only expensive but also biocidal to some other livings in the snail habitat (WHO, 1965). Attempts were done by many researchers for screening toxicant plants to the snail host for fascioliasis and schistosomiasis as those of Bali *et al.,* (1992); Mendonca, (1994); Singh and Singh, (1995); Lotfiy and Abdel-Gawad, (2000).

In this study we aimed to spot further lights on the freshwater snails present in Beni-Suef Governorate, their ecology, stages of parasites in such snails, their natural eminent and testing the molluscicidal effects of some plants on the snails

Materials and methods

Collection of the snails. Snails have been collected from some ditches like ponds near the river Nile in Beni-Suef Governorate. The process was attempted out using simple wire net (25cm. in diameter with about 180 cm. handle, 10 cm. the depth of the net scope, and 25 meshes per square centimetre. Some aquatic weeds and mud from the area of collection were taken with the snails to the laboratory in plastic containers. Collection of these snails repeated through three times climatically differed, firstly in December 2008 then Marsh 2009 and lastly July 2009.

Examination of collected snails. In the laboratory different species identified according to Mandahl-Barth, (1962) and separated in plastic plates containing dechlorinated water and some aquatic plants as Erchornia crassipes (Ward El-Nile), Ceratophylum demersum (Naukhshoush El-Hout) and Limnagiba (Adas El-Maa) obtained from the source of collection

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Table (1): Collected snails.

Types of snails	Date of collection					
	Dec-08		Mar-09		Jul-09	
	No.	%	No.	%	No.	%
Lymnaea sp.	70	5.299	120	8.759	10	0.826
Biomphalaria sp.	50	3.785	40	2.920	11	0.809
Bulinus sp.	40	3.028	70	5.109	50	4.129
Lanistes sp.	180	13.626	230	16.788	200	16.515
Cleopatra sp.	100	7.570	110	8.029	20	1.652
Physa sp.	31	2.347	120	8.759	50	4.129
Viviparus sp.	120	9.084	530	38.686	850	70.190
Melania sp.	500	37.850	130	9.489	20	1.652
Bivalves	230	17.411	20	1.460	0	0.000
Total snails	1321		1370		1211	

of the snails Fig.1. Some of these snails taken in betry dishes and subjected to strong light for about one hour for cercarial shedding, also crushing of some snails for detection of larval stages under the dissecting microscope. Another part of the snails left for rearing in the laboratory.

Studying the predatory aquatic insects found with the collected snails. By leaving these insects (which were captured with the snails from sites of collection) with the snails to detect their predatory effects on the snails and their egg masses. Also some snails were left with Tilapia nilotica fish in an aquarium for several days.

Testing for Molluscicidal activity of the Oleo-gum (Commiphora molmol). The oleo-gum resin Myrrh (Commiphora molmol) was added in known weights to a definite volumes of water in the plastic plates containing snails (reared in the laboratory), detection of numbers of died snails were recorded after 24, 48 and 72 hours exposure to tested plant compared with snails in the control plates(without tested plant).

Results

Collected Snails. The snails collected during December 2008 , March 2009 and July 2009 as shown in Table (1) were *Lymnaea cailliaudi*, *Biomphalaria alexandrina*, *Bulinus truncatus*, *Lanistes carinatus, Cleopatra bulimoides ,Physa acuta , Viviparus viviparus, Melania tuberclata* and *Bivalves*. The total number of collected snails in December 2008, March 2009 and July 2009 were 1321, 1370 and 1211 respectively. Some of these snails reared in the laboratory in plastic plates separately. The recorded survival longevity in the laboratory was more than 90 days for *Lymnaea cailliaudi*, two months for *Lanistes carinatus*, while in *Melania tuberclata*, it was about three weeks and two to three days only for *Bivalves.*

Larval trematodes in the snails. Cercariae were shedding from *Lymnaea cailliaudi*, *Lanitses carinatus* and *Biomphalaria alexandrina* snails, and rediae were found in crushed *Lymnaea* snails in 14% of crushed snails, also stylet cercaria was found, sporocysts and rediae were found in crushed *Lanistes* snails and sporocysts in *Biomphalaria*.

Predators of the snails. Aquatic insects and their larvae were found especially water bug Sphaerodema sp. found predating snails or their eggs, also the mature insect still alive in the breeding container all over the period of the experiment more than three monthes. Culex larvae were attacking the snail egg masses.

Putting of some snails and their egg masses in aquarium containing Telapia nilotica fishes showed low affinity to predate such snails even when fasten about 24 hours.

Mollusccidal activity of the Oleo-gum (Commiphora molmol). The oleo-gum Myrrh (Commiphora molmol) applied in the plates in which snails reared showed that the concentration 0.5gm/1 litre water killed 90 % of the exposed snails after 72 hours, while snails in the control plates showed no change.

Discussion

The freshwater snails collected during the three different periods (December 2008, Marsh 2009 and July 2009) were 1321, 1370 and 1211 snails respectively with larger number in Marsh than in July or December due to optimal climatic conditions in marsh for most of collected snails although these results differ to some extent with those found by Gamal *et al.,* (2000) in Suez canal region who mentioned that they collected abundant of freshwater snails during April, May and June while lowest collection was during November and December with total absence of such snails in January, but we think that such

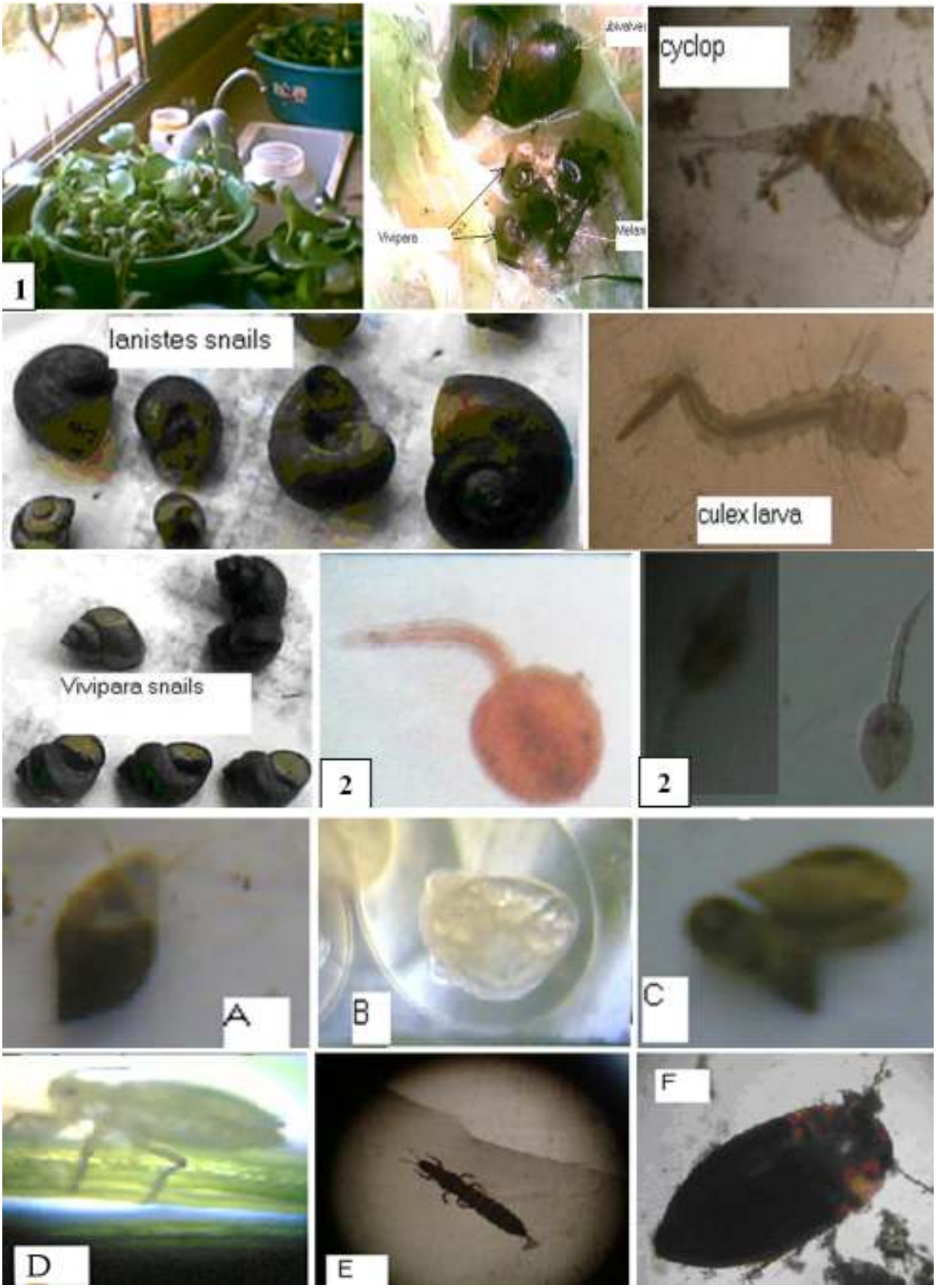

Fig.1:1 Plastic plates for snail rearing; 2: Leptocercus cercaria; A: Lymnaea snail; B: egg mass with small snails; C: Lymnaea shells; D, E, F and D: Aquatic insects and instar.

difference may be due to different localities due to close association between soil type and the distribution of the snail according to Wright *et al.,* (1984) and different years of collections beside the presence of other factors as different snail species in both cases and presence of predators. Here we found snails of *Lymnaea cailliaudii*, *Biomphalaria alexandrina*, *Bulinus truncatus*, *Lanistes carinatus*, *Cleopatra bulimoides*, *Physa acuta*, *Viviparus viviparus, Melania tuberclata* and *Bivalves*. These snails showed different percentages during the different three periods of collection as in Table (1) where *Melania tuberclata*, *Bivalves*, *Lanistes carinatus*, and *Viviparus viviparous*, respectively recorded the highest percentages, in the other hand the lowest percentages were noticed in cases of *Physa acuta*, *Bulinus truncatus*, *Lymnaea cailliaudi* and *Biomphalaria alexandrina* during December 2008, but in Marsh 2009 the highest percentages recorded by *Viviparus Viviparus*, *Lanistes carinatus*, *Melania tuberclata*, both of *Lymnaea cailliaudi* and *Physa acuta* then lastly *Cleopatra bulimoides*, while the lowest percentages were with *Bivalves*, *Biomphalaria alexandrina* and *Bulinus truncatus*, in July 2009 *Viviparus viviparus* recorded the highest percentage followed by *Lanistes carinatus*, the lowest were *Lymnaea cailliaudi*, *Biomphalaria alexandrina*, *Melania tuberclata*, *Cleopatra bulimoides*, *Bulinus truncatus* and *Physa acuta* while *Bivalves* not found.

Belonging to longevity of viable snails under the laboratory conditions (in plastic plates with declorinated water and the aquatic plants brought with the collected snails) we found that the viability of *Lymnaea cailliaudi* snails was more than three months followed by *Lanistes carinatus* snails about tow months and three weeks for *Melania tuberclata* the lowest longevity was that of *Bivalves* which was not more than three days, while Iheagwam-EU and Okafor-FC (1984) recorded average longevity for laboratory reared *Lymnaea natalensis* (=*cailliaudi*) 106.4 days and 180.4 for *Bulins globosus* in Nigeria we think that the difference between our results may be due to different species and geographic areas and climate.

Cercariae were shedding from *Lymnaea cailliaudi, Lanistes carinatus* (leptocercus and stylet cercariae) and from *Biomphalaria alexandrina* (forcocercus cercariae), also rediae and sporocysts were found in crushed snails in all periods of collections with little difference between these periods, about 14% of crushed *Lymnaea cailliaudi* were containing rediae nearly as the results of El-Dafrawy, (2002) who found that 11% *Lymnaea natalensis* (=*cailliaudi*) snails collected from several localities in Giza governorate were shedding cercariae of *Fasciola gigentica.*

The most recorded predators for the snails in this study was aquatic insects and their larvae especially water bug *Sphaerodema* sp. which predate snails and their egg masses as recorded by many authors as Raut and Saha, (1989); Panigrahi-A (1999), also culex larvae strongly attacked egg masses of the snails Estacoza were predating the snails.

Mollusccidal activity of the Oleo-gum Myrrh (Commiphora molmol**)** applied in the plates in which snails reared showed that the concentration 0.5gm/1 litre water killed 90 % of the exposed snails after 72 hours, while snails in the control plates showed no change, this is in agreed with that of other researchers as Massoud *et al.,* (2000); Ahmed *et al.,* (2004).

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بعض الدراسات المعملية على قواقع المياه العذبة ودراسة تأثير بعض النباتات فى المقاومة البيولوجية للقواقع فى محافظة بنى سويف

تم تجميع قواقع المياه العذبة من مستنقعات قرب نهر النيل فى محافظة بنى سويف خلال ثلاث فترات مختلفة مناخياًو كانت من أنواع ليمنيا، بيومفلارايا، بولينس، لانيستس، كليوباترا، فايزا، فيفيبارا، ملانيا و ذات الصدفتين. وكان مجموع القواقع خلال ديسمبر ٢٠٠٨، مارس ٢٠٠٩ و يوليو ٢٠٠٩ هو : ١٣٢١، ١٣٧٠ و١٢١١على التوالى وبعدد أكبر فى مارس عنه فى يوليو أو ديسمبر، وكانت مدة بقاء القواقع حية فى المعمل أكثر من ٩٠ يوماً لقواقع ليمنيا، شهرين لقواقع لانيستس، ثلاث أسابيع لقواقع ميلانيا و من يومين لثلاثة أيام فقط لذوات الصدفتين (بايفالفس) .

وجدت السركاريا الناتجة من قواقع ليمنيا ولانيستس وبيومفلاريا إلى جانب نوع استايلت سركاريا من قواقع ليمنيا ووجدت اطوارالاسبوروسيست والريديا فى قواقع لانيستس واسبوروسيست فى قواقع بيومفلاريا المسحوقة فى كل فترات التجميع مع اختلافات بسيطة بين هذه الفترات و كانت اطوار الريديا فى حوالى ١٤٪ من قواقع ليمنيا المسحوقة.

وقد وجدت حشرات مائية ويرقاتها خاصة حشرة بق الماء تهاجم القواقع وبيض القواقع وتفترسها ولوحظ بقاء هذه الحشرة حية طوال فترة التجربة أى أكثر من ٩٠ يوماً. وقد لوحظ أن يرقات بعوض الكيوليكس تفترس بيض القواقع بينما لوحظ أن اسماك البلطى لها قابلية ضعيفة لافتراس القواقع حتى أثناء تصويم هذه الأسماك لأكثر من ٢٤ ساعة.

وبالنسبة لاختبار سمية نبات الكمفورا (صمغ) وجد أنه بتركيز ٠,٥ جرام لكل لتر ماء فى أطباق تربية القواقع قد قتل ٩٠٪ من القواقع بعد ٧٢ ساعة .