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THE PECULIARITIES OF PREVALENCE OF *HELIX POMATIA* SNAILS IN KURTUVĖNAI REGIONAL PARK (LITHUANIA)

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Though snails (*Helix pomatia* L.) make damage for the plants, they are more known as useful molluscs. The aim of this study was to evaluate the peculiarities of prevalence of *Helix pomatia* in Kurtuvėnai Regional Park. Since this park takes large territory (15 090 ha), eight different localities of biotops were chosen to search these snails. The research was made in May and July 2009. For the count of snails, the 45m^2 size squares (5 squares of 9 m^2, stated in chequerwise) were railed in the each chosen locality. The area of all investigated squares were 360 m^2 (8x45 m^2), in which 415 snails were found on May and 495 snails – on July. By the diameter of the shell, the snails were divided into young (to 20 mm), adolescent (21-30 mm) and adult (over 30 mm). The investigation data indicated that in the chosen localities of Kurtuvėnai Regional Park the average profusion of the snails was 1.15 pc./m^2 in May, and 1.37 pc./m^2 in July. The snails for the market can be picked from 1st May till 1st July. Therefore the increased number of the snails might be related to this prohibition, because the picking snails for the market are quite popular with local inhabitants. The biggest number of snails per square meter was found in July at Margiai homestead (2.16 pc./m^2), the least number – in May in the Kurtuvėnai old cemetery (0.69 pc./m^2). Influence for the greater density of molluscs in above mentioned homestead may had there predominant white clover (*Trifolium repens* L.), which is one of the most favourite plants for snails. Also, there is low attendance in this homestead, and the household activities (the grass cutting) did not made any negative influence for the snail population. 63 % snails were found in the surface of the meadow (field) and 37 % in the natural (among stones, fallen leaves and branches) or artificial (among litter left by holidaymakers and fishermen) hideouts. The activeness of the snails depends mostly on meteorological conditions: 76 % snails were found in humid weather. In the time of research, the adolescent *Helix pomatia* L. dominated (63 %) in Kurtuvėnai Regional Park.

Key words: *Helix pomatia* L., biotop, prevalence.

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INTRODUCTION

To Lithuania from France imported *Helix pomatia* L. currently become important trade object. It is the largest mollusc of *Gastropoda* class Helicidae family in the country (Šivickis 1960). Snails slowly crawl on the plants, inch by inch eating them. Snails eat all the plant, but prefer more soft parts of it, eg. young offsets, leaves, roots and trusses. Though snails (*Helix pomatia* L.) make damage for the plants, they are more known as useful molluscs. In Lithuania

they are used for food only as a delicacy, though they are especially well - liked in France, where many various dishes are made from these snails. Meat of the snails is dietary food. These snails are also used in producing pharmaceutical and cosmetics (Janušauskas 2007). Therefore picking and growing the snails becomes more and more popular. Lithuania exports some hundred tones of snails every year. There are about 150 snail breeders in the country (National association of *Helix pomatia* breeders 2008*)*, there are some companies having licences to buy and realize snails. While picking *Helix pomatia* becomes more active it is important to control the state of natural population of these snails in their biotops. Population is not particularly damaged when not more then 44% adult snails are eliminated each year (Stzepczak 1992). Critical limit for snail population in Lithuania is indicated to be 0.5 pc./m^2. If in the time of recording there are less snails than this limit, it is necessary to stop their exploitation in this area. In forests, parks and gardens of investigated fifteen districts of Lithuania in July – August 2002, the general average of snails was 0.75 pc./m^2 and did not exceeded critical limit (Skujienė & Vaivilavičius 2004). Moreover, snails are excellent bioindicators of environmental pollution. *Helix pomatia* through it's foot absorbs water together with heavy metals and other toxins, which later are included in the consist of shell (Pavel & Kucera 1986, Greville & Morgan 1991). Yet snails have many enemies, their meat is well – liked by lizards, moles, mice, hedgehogs, frogs, raptorial insects, as well as cranes, storks and other birds (Janušauskas 2007).

The distribution of this kind of snails is mostly determined by their habitable and nutritional environment (Šivickis 1960, Kerney et al. 1983, Hansson 1991, Gurskas 1997, Skujienė & Vaivilavičius 2001, 2004, Šatkauskienė 2004, Raišuotytė & Jankauskienė 2005). The best suited soil for snails is limy, not sour with grassy covering. They reproduce in gardens, parks, leafy forests, bushes near to the water, cemeteries, meadows. These snails do not like coniferous woods. The place should be enough moist, shady, not heated by direct rays of sun. In the dry and sunny periods they become sessile, hide under the stones, branches or elsewhere. While seeking to preserve populations of this species of snails, it is necessary to investigate their density in different places. With respect to it especially interesting places are national and regional parks, reservations and conservation areas, which characterize in their specific biotops.

The aim of this study was to evaluate the peculiarities of prevalence of *Helix pomatia* in Kurtuvėnai Regional Park.

MATERIAL AND METHODS

Because Kurtuvėnai Regional Park takes large territory (15 090 ha), eight different localities of biotops were chosen to search of *Helix pomatia* snails:
1 – the park of Kurtuvėnai town,
2 – the old and unfrequented cementery of Kurtuvėnai (moist pothole at cultivated fields),
3 – the base of Girnikai hill (dry meadow),
4 – the strand of Pašvinys lake (moist meadow),
5 – the homestead of Margiai village (mowed off garden),
6 – the moist meadow at Svilė springhead,
7 – the Vainagiai mound (meadow with yester leaf and fallen branches of trees),
8 – the strand of Bijotė lake (moist meadow).

The localities chosen are sufficiently moist, shady and not heated by direct rays of sun. In these localities dominant plants, farming activity and attendance of people was analysed too. The research was made in May and July 2009 by the recording method of R. Rakauskas (1996). For the count of snails, the squares of 45 m^2 size (5 squares of 9 m^2, stated in chequerwise) were railed in the each chosen locality (Fig. 1). The area of all investigated squares were 360 m^2 (8x45 m^2), in which 415 snails were found on May and 495 snails – on July. May was variable month: in the first decade rained quite often, starting from second decade settled dry weather, with some frost in the night time. In this month snails were picked from 8th to 23rd

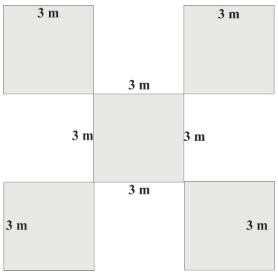

Fig.1. Scheme of arrangement of investigation squares.

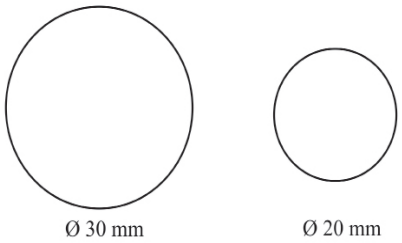

Fig. 2. Scheme of stencil.

day, once in every location, in 7-11 a.m., when the temperature was 9-13 ^{0}C. In this spring month snails intensively begin copulate. In July weather was warm and rainy, therefore the second record was made in this time. In this summer month snails were picked from 4th to 18th day, once in each location, 8-10 a.m., when temperature was 15-18 ^{0}C.

In order to estimate age of the snails, the stencil with gaps of 20 and 30 mm diameter, made from hard carton was used (Fig. 2). The molluscs were passed through these gaps. By the diameter of the shell, the snails were divided into young (to 20 mm), adolescent (21 – 30 mm) and adult (over 30 mm).

RESULTS AND DISCUSSION

The investigation data indicated that in the chosen localities of Kurtuvėnai Regional Park the average profusion of the snails was 1.15 pc./m^2 in May, and 1.37 pc./m^2 in July. The snails for the market can be picked from 1st May till 1st July. Therefore the increased number of the snails might be related to this prohibition, because picking snails for the market is quite popular with local inhabitants. The distribution of *Helix pomatia* by biotops is presented in Fig. 3. The biggest number of snails per square meter was found in July at Margiai homestead (2.16 pc./m^2), the least number – in May in the Kurtuvėnai old cemetery (0.69 pc./m^2). Influence for the greater density of molluscs in above mentioned homestead may had there predominant white clover (*Trifolium repens* L.), which is one of the most favourite plants for snails (Čeponienė 2002). In Margiai homestead snails are not exploited (are not picked for sale). Also, there is low attendance in this homestead, and the household activities (the grass cutting) did not made any negative influence for the snail population. So in all eight biotops investigated molluscs did not exceed critical limit of 0.5 pc./m^2 (Skujienė & Vaivilavičius 2004). Though R. Rakauskas (1996) as a critical limit of profusion of *Helix pomatia* L. population indicates to be 1 pc./m^2.

It was determined that various hideouts make influence to living environment of snails. *Helix pomatia* snails were found in the natural hideouts (in the strand of Pašvinys lake snails were found among stones, in the territory of Vainagiai mound - among yester leaf and fallen branches) and in artificial hideout also (in the strand of Bijotė lake - among litter left by holidaymakers and fishermen). In the data of Fig. 4, 338 snails or average 37% of all the snails (40% in May, 34% in July) were found in hideouts. The most preferred hideout was fallen leaves and branches. In the rest of five investigated locations molluscs were found on the surface of meadow or field, it was 572 snails or average 63% of all the snails (60% in May, 66% in July). Majority of *Helix pomatia* L. were found in moist biotops and garden. Thus this research confirms data of literature about the living settings of these molluscs (Gurskas 1997, Skujienė & Vaivilavičius 2004, Janušauskas 2007). The activeness of the snails depends mostly on meteorological conditions. Most of the snails (76%) were found in moist and warm weather.

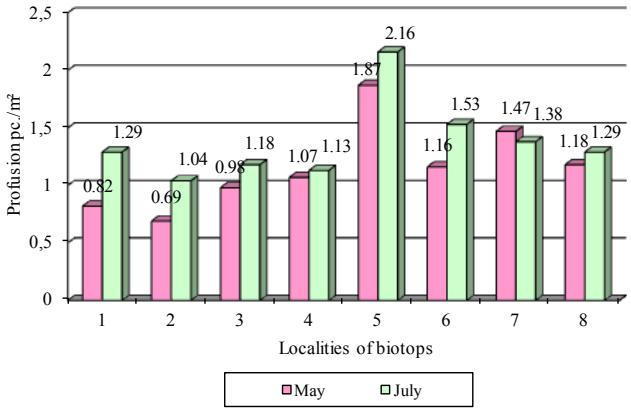

Fig. 3. The distribution of *Helix pomatia* by biotops.

Localities of biotops:1 - the park of Kurtuvėnai town, 2– the old and unfrequented cemetery of Kurtuvėnai (moist pothole at cultivated fields), 3– the base of Girnikai hill (dry meadow), 4– the strand of Pašvinys lake (moist meadow), 5 – the homestead of Margiai village (mowed off garden), 6 – the moist meadow at Svilė springhead, 7 – the Vainagiai mound (meadow with yester leaf and fallen branches of trees), 8 – the strand of Bijotė lake (moist meadow).

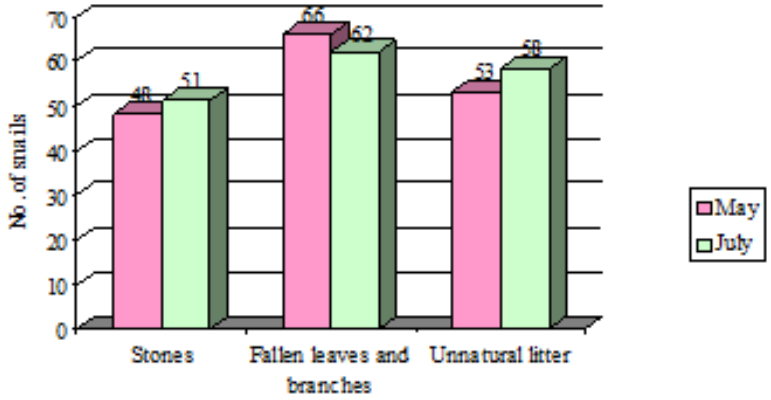

Fig. 4. Number of *Helix pomatia* found in hideouts.

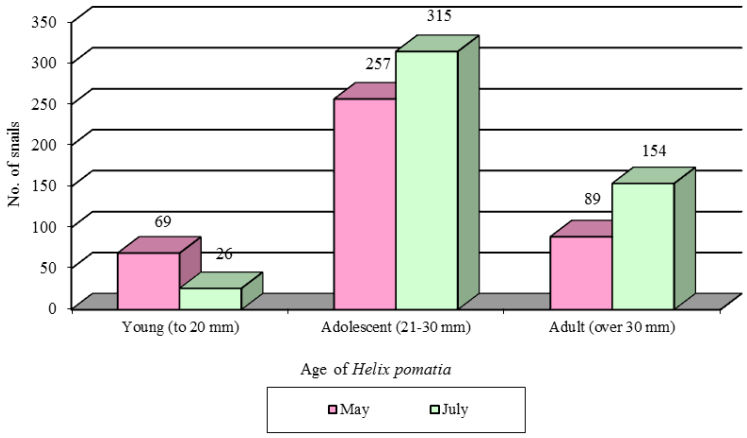

Fig. 5. The distribution of *Helix pomatia* by age.

The distribution of *Helix pomatia* L. by age is presented in Fig. 5. In the population age structure 10 % comprised young, 63 % - adolescent and 27 % - adult snails. The relative number of adult snails can be explained by exploitation. Adult snails are most easily noticeable and therefore more of them are picked. After exploitation period, in July, the fast increase of the number of adult snails can be observed. The dynamics profusion and age structure of snails is confirmed by other researches of exploitation influence (Stzepczak 1992, Skujienė & Vaivilavičius 2004).

CONCLUSIONS

In the chosen localities of Kurtuvėnai Regional Park the average profusion of the snails was 1.15 pc./m^2 in May, and 1.37 pc./m^2 in July. The household activities (the grass cutting) did not make any negative influence for the snail population. The profusion of these molluscs more depends on exploitation and attendance of people.

63 % snails were found in the surface of the meadow (field) and 37 % in the natural (among stones, fallen leaves and branches) or artificial (among litter left by holidaymakers and fishermen) hideouts. 76 % snails were found in humid weather. In the time of research, the adolescent *Helix pomatia* L. dominated (63 %) in Kurtuvėnai Regional Park.

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