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Population of the Big Firefly (*Lampyris noctiluca*) and Some of its Biological Characteristics

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ABSTRACT. The study of big fireflies (*Lampyris noctiluca*) in different natural ecosystems (deciduous forest, bushes, fields, agrocenosis) and biological peculiarities revealed by laboratory studies are presented. The propagation and protection of the above species is very important for Georgia.

Key words: pesticides, copulate, generation, dimorphism, ontogenesis.

The fireflies family (*Lampyridae*) belongs to a range of hard-winged insects i.e. beetles (*Coleoptera*). Due to the body softness they are often called soft-body insects.

Very little information is given on the morphology, biology and ecology of *L. noctiluca* in [1-3]. Research was carried out in Saguramo, Tskhvarichamia, Thezami and Kevliani territories (Mtskheta region); also at the Laboratory of the Institute of Zoology.

Different natural ecosystems such as: leafy forests, bushes, meadows, agrocenose were studied on *L. noctiluca*. The studies were carried out on the area of 3-5 ha ($n = 4$) in each ecosystem per season (May, June, July, October). Registration was done according to the well-known method of Metlitski [4]. The separate registration area was about 12 m² (3x4).

The adult forms of *L. noctiluca* are available from the end of May till the first decade of August. The rest of the time they are not met. As for their worms, they are found all the year round except winter.

The studies have shown that the adult forms of *L. noctiluca* and worms, are unequally distributed in different ecosystems (Table 1). Most of *Lampyridae* have been observed on the slope covered with bushes. Their amount per season was 5.6-8.5 specimens (3000-4500 specimens per ha), while in fields their number was 3.3-5.5.

As for deciduous forests and agrocenoses, the fireflies were revealed here in small amounts (0.3-2.5 and; 1.3-3.3 specimens).

The above ecosystems were also studied in the following year (1989). The number of fireflies observed this time approximated the number of that of the previous year. As before the most amounts of *L. noctiluca* 6.4-7.3 sp. were found on the bushy slopes.

The obtained results showed that the most amounts of *L. noctiluca* are noticed under the cover of shrubs. The fact indicates, that the best living conditions such as food, temperature, humidity, flora etc., are preserved for *L. noctiluca* in the above ecosystem as compared with the other ones (leafy forests, meadows etc.). Their number is too small in agrocenoses, the anthropogenic factor being the reason. The soils here are cultivated almost every year. Different kinds of pesticides are also used which affects *L. noctiluca*.

In vitro studies the biological peculiarities of *Lampyridae* have been revealed and established: 1. They lay out ovums in small groups on substrate (from 3 to 21) Ovums shine in darkness. They can be seen from 10-12 meters distance. Male dies after copulation but

Table 1
Lampyris noctiluca numbers in different ecosystems

Natural Ecosystems	The average number of <i>Lampyris noctiluca</i> (on the area of 12 m ²) according to season			
	May	June	July	October
Deciduous	1988			
Forest	2.5	0.3	1.3	0.6
Bushes	7.6	8.5	5.6	3.3
Fields	3.3	5.5	4.3	2.3
Agrocenosis	-	3.3	1.3	-
Deciduous	1989			
Forest	0.5	1.6	0.6	0.7
Bushes	6.4	6.7	7.3	3.9
Fields	0.6	4.6	3.3	3.1
Agrocenosis	1.3	2.1	-	1.7

female-after laying ovums. 2. Incubated worms of age 1 become active immediately. The highest death-rate is marked in worms of age I-II (56.5%) within the period of their development. The size of the last age worms of the same generation fluctuates from 21 mm to 37 mm. The most amount of worms made 18.5 specimens (in 12 m²) under the plant covering of wild pear, cornel, wild plum, hawthorn and medlar. The female forms are developed from the big-sized worms of the last age after chrysalisation, while males from small-sized ones. 3. Out of *L. noctiluca* chrysalises coming of the same generation worms, males appear first, while-female specimens after 14-16 days. Newly incubated females and males can copulate. 4. The adult forms do not feed. Female is characterized with sharp illumination, but male with the weak one. The above species have sharply expressed sexual dimorphism, which is characteristic to *Lampyridae* family.

As the study of biology and population of *L. noctiluca* showed it can be attributed to a group of useful insects. It can protect both the forest and agricultural plants from gnawing mollusks. The *Luciferine* substance extracted from its body is used in medicine as preparations (for infarction diagnostics).

Thus the studied *L. noctiluca* with its natural peculiarities is an interesting and useful insect. It slowly propagates in natural conditions as its ontogenesis embraces three years [3]. In average only a few amount of worms incubated out of 60±15 ovums reaches the adult form. It is also known that the area of its distribution is limited under Georgian conditions. Thus the propagation of the studied species and its protection in nature have practical importance.

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