METODE DE CONTROL A POPULAȚIILOR DE BROAŞTE RÂIOASE DIN CADRUL FERMELOR DE CREŞTERE A MELCILOR ÎN CICLU BIOLOGIC COMPLET ÎN AER LIBER

METHODS OF CONTROLING TOADS POPULATIONS INSIDE OUTDOOR SNAIL FARMS

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SUMMARY

The purpose of present study is to identify some alternative methods for controling toad (*Bufonidae* family) populations which can emerge inside outdoor snail farms. For achieving this goal it is absolute indispensable to understand the toad ecologic preferences in order to ensure a proper trap location and to prevent toad entrance and reproduction inside the farm.It is known that all amphibians consume snails, especially the young ones, which can be easily eaten due to their small sizes.The toads are land amphibians and can easily enter and survive inside the farm pens, thus is highly recommended a close toad population surveilance. We used four samples of twenty traps: sample 1 (S_1)= lighted trap; sample 2 (S_2) = lightless simple traps; sample 3 (S_3) = lightless traps placed on external alleys near the zinc coated iron plate fence; sample 4 (S_4) = lightless traps placed on internal alleys between rearing pens and conceived two comparation systems: the first (C_1) between sample 1 and sample 2, and the second (C_2) between sample 3 and sample 4. The results demonstrated that the lighted traps are more efficient than lightless traps and that location is a key factor in proper trap working.

1. MATERIAL ŞI METODĂ

To understand some terms used in this paperwork a brief description of an outdoor snail farm (italian method) it is necessary. Near the farm surrounding fence made from zinc coated iron plates, there is a buffer area, one meter wide, which is kept clean, without vegetation to prevent predator for walking into the farm and to allow an easy watching of potential pests. Inside the farm there are snail rearing pens, fenced in Helitex net, separed one from another by internal alleys and from external fence by external alleys.

Normally, the toads are not a major pest for snail farmers but in the rainy seasons especially in the case of boggy and clayey soils there are proper conditions for toads proliferation, so that the snail harvest can be compromised.

First for an effective toad population control we must know their ecologic preferences. The green toad (*Bufo viridis*), the most spreaded member of *Bufonidae* family, is a massive, green spoted toad, measuring till 10 cm (fig. 1.). Excluding the reproduction season *Bufo viridis* can be frequently seen hunting butterflies, moths and other flying insects around electric lights (enciclopedie.zooland.ro). The green toad is one of the most adaptable paleoarctic amphibians and inhabits a wide variety of habitats from steppe to mountains; in open spaces prefers the irrigated areas, such as snail farms. Egg laying and juvenile development stages take place in permanent or temporary watterponds (ARNOLD, 2003), so that the irrigation must be performed avoiding watter stagnation.

In july 2005, a snail farm of 2000 sqm, specialized in *Helix pomatia* rearing, located in Săcălaz, Timiş county, registered an almost complete juvenile snail disappereance (3-4 month old snails with shell diameter till 1 cm) due to little green toad invasion. Spring and summer heavy

rainfalls lead to a great population increase till the density 10 toads/sqm. After using the traps juvenile snail occurrence was observed, so that till the year end three juvenile lots were mentioned.

Fig.1. - *Bufo viridis* (european green toad)

For controlling the toads we used traps similar with those used for catching frogs in the wild. Such a trap is made from a butt fitted with access platforms and a light placed over it (BURA, 2002).

The trap working principle is based on the positive insect phototropism. The large insect number around light source lures the toads, which climb the access platforms, drop into the butt and remain captive till their gathering.

Starting from the above-mentioned principle we tried to adapt the trap to snail farming conditions, to identify the most favourable trap locations and tested by comparison trap eficiency in presence/absence of light.

Toad traps are made from plastic containers, buried in the soil.A medium depth container is enough because the toad jumps are less higher than those of their aquatic relatives so that it is very difficult for them to jump outside the trap.

As recipients we used two liter plastic bottles after cuting and removing their superior part. The traps (fig. 2), were buried 25 cm, so their uper part was just above ground level and placed them from six to six metres.

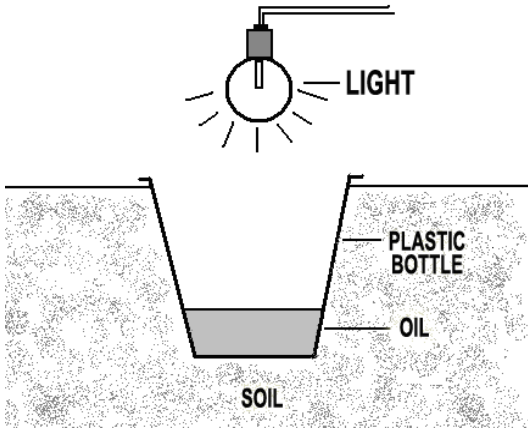

Fig.2. – Toad trap

As a supplementary prevention measure the bottle bottom can be filled with burn engine oil, so if the toad escapes the grease over his skin will decrease the tegumentary gas exchange level and thus toad death (www.prohelix.ro). However because the toads are a friend of gardeners (in U.E. is even considered as an endangered species) it`s more human to release them into the wild.

2. REZULTATELE CERCETĂRILOR

In order to ensure an objective data analysis the experiments lasted one week and we used different trap models (lighted and simple traps) and locations (near external fence and on the internal alleys) as folow: sample 1 (S_1)= twenty lighted trap; sample 2 (S_2) = twenty simple traps; sample 3 (S_3) = twenty simple traps placed on external alleys near the zinc coated iron plate fence; sample 4 (S_4) = twenty simple traps placed on internal alleys between rearing pens. Moreover we also conceived two comparation systems: the first (C_1) between sample 1 and sample 2, and the second (C_2) between sample 3 and sample 4.

Because the toads are nocturnal creatures, the traps were daily checked in the morning and the toads gathered. Then we estimated the daily mean toad number/trap (noted dS_1, dS_2, dS_3 and dS_4) calculated as the raport between the total toad number gathered daily for each sample and the number of traps (20), considered as a unitary value.

Finally evaluated the daily mean toad number/trap model (noted DS_1, DS_2, DS_3 and DS_4) as follow:

$$DS_n = \frac{\sum dS_n}{7}, \text{ where } n = 1, 2, 3, 4$$

The results are presented in table 1.

Table 1

The mean toad number depending on trap model and location

Comparision system	**C_1**		**C_2**	
dS	**dS_1**	**dS_2**	**dS_3**	**dS_4**
Day number	-	-	-	-
Day 1	12	10	11	5
Day 2	10	9	9	5
Day 3	13	9	8	4
Day 4	7	8	8	2
Day 5	7	5	6	1
Day 6	6	2	2	-
Day 7	3	2	2	-
DS_n	8.3	6.5	6.5	2.5

In the case of C_1, as we observed from table 1, the trap works even in light absence but their efficiency is lower: the lighted traps (S_1, DS_1 = 8.3) are by 21.67% more efficient than the simple traps (S_2, DS_2 = 6.5). However in choosing the trap the economic aspects must be considered because the electric energy consumption in the case of lightened trap increase farm maintenance expanses, thus trap location is very important.

Regarding the trap location a good understanding of toad ecologic preferences (toads prefer humid and low areas) is crucial. In the case of C_2 comparing DS_3 with DS_4 values we determined that the traps from external alleys, near the zinc coated iron plate fence (S_3, DS_3 = 6.5**)** are by 61.5% more effective more than those placed on internal alleys (S_4, DS_4 = 2.5).

Comparing the trap efficiency during the time using comparation systems we found that starting from the sixth day (in the case of comparation lighted traps vs. simple traps) and respective from the fifth day (in the case of comparation traps located near external fence vs. traps placed on internal alleys) the first sample traps (S_1 and S_3) were much more effective than those of the second sample traps (S_2 and S_4)

The dS value decrease during the week demonstrated the trap viability.

Anyway for avoiding such situations it is indicated:

- to perform an accurate soil granulometry determination to know if it is necessary to perform watter drainage works like: ground scarification, amendment application (sand or higroscopic substances such as quick lime, which also improves soil calcium content and has a disinfecting effect), watter drains setting up
- to respect the hygiene standards
- to optimize irrigation for providing the adequate watter amount that soil needs, preventing watter sloping and thus avoiding the existence of proper places for toad reproduction
- to drain the muddholes from farm and buffer area
- to keep the perimetral fences integrity by periodic inspection and damages reparation. In the same time the watter acumulations occuring on farm and buffer area
- to keep buffer area clean without vegetation
- to place toad traps along and near the iron sheet fence, from six to six metres, before the population time to prevent a possible proliferation of toad population

3. CONCLUZII

Keeping under control the toad population is an important aspect for ensuring a snail farm rentability. Because outdoor snail rearing should be an ecologic technology is esential that when a farm is build up to avoid, as possible, the existence of place suitable for toad hiding and reproduction and to locate the traps along external zinc coated iron plate fence.

Based on the expriments we concluded that:

- the lighted traps (S_1, $DS_1 = 8.3$) are by 21.67% more efficient than the simple traps (S_2, $DS_2 = 6.5$).However in choosing the trap the economic aspects must be considered because the electric energy consumption in the case of lightened trap increases farm maintenance expanses
- trap location choosing is very important: the traps from external alleys, near the zinc coated iron plate fence (S_3, $DS_3 = 6.5$) are more effective by 61.5% more than those placed on internal alleys (S_4, $DS_4 = 2.5$).
- starting from the sixth day (in the case C_1) and respective from the fifth day (in the case of C_2) the lighted traps, respective the traps located near external fence were much more effective than the lightless traps, respective the traps from internal alleys
- the decrease of daily captured toads during the week confirms that the trap are working

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