

FINAL REPORT

Conservation of the globally threatened tortoises *Testudo hermanni* and *Testudo graeca*
in the Eastern Rhodopes Mountain, Bulgaria



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1 Report on activities

The present report is based on planned and realized activities from “Conservation of the globally threatened tortoises *Testudo hermanni* and *Testudo graeca* in the Eastern Rhodopes Mountain, Bulgaria” project.

Research of the fire impact on tortoises’s populations in the Eastern Rhodopes Mountain.

Project activities started with field surveys that comprise significant part of project realization. Field survey was based on and conducted in accordance with scientifically proven methodology developed earlier (Appendix 1) at 6 fire territories in Eastern Rhodopes.



Fields are chosen to include territories with several fires at different time periods (95/96, 2000, 2003 и 2004 г.) together with unburned sectors used as samplings. Total area of burned and sampling territory is 16 426 decares. Three experts and 10 volunteers took part in the survey; they spent 114 man-days on the field.

- Researched territories were chosen based on the following criteria:
- Year of fire. It is compulsory to be in one of the following: 95/96, 2000, 2003 г.;
- Acreage of fired territory – no lesser than 100 decares;
- Type of burned vegetation – priority was given to fires in deciduous forests or vegetation zones predominantly with oak (*Quercus* sp.), yoke-elm (*Carpinus* sp.), thorny-bush (*Paliurus spina-christi*), etc.;
- Herpetological importance of the area;

Information concerning every single fire was collected and analyzed in advance: location, fired acreage, type of fire (high/low), type of vegetation, losses in BG Leva, and forest topographic maps of the scale one to ten-thousand.



Fig. 1 Surveyed fires in 2005.

Legend: Fire in 2004 close to built-up area:

1. Dositievo village. Fire in 2003 close to built-up area:

2. Kolets village;

3. Ostar Kamak village. Fire in 2000 close to built-up area:

4. Kostilkovo village. Fire in 1996 close to built-up area:

5. Gorno Lukovo village.

6. Gorno Bryastovo village;

1.1 Results from the survey:

Up to now we are still working on detailed analysis of gathered data and in this report we have included the results from the analysis already done. The complete analysis will be published as a scientific article, copy of which will be sent to Rufford Small Grants Head Office.

The conducted survey shows that the effect of the fires on the two tortoise species is most evidently seen with fires from the last few years (recent ones) and is in close connection with the intensity of the fire (high intensity fire type and low intensity fire type). As for the high type of fire in the region of Kolets village (in 2003) data was collected during the first and the second year after the fire:

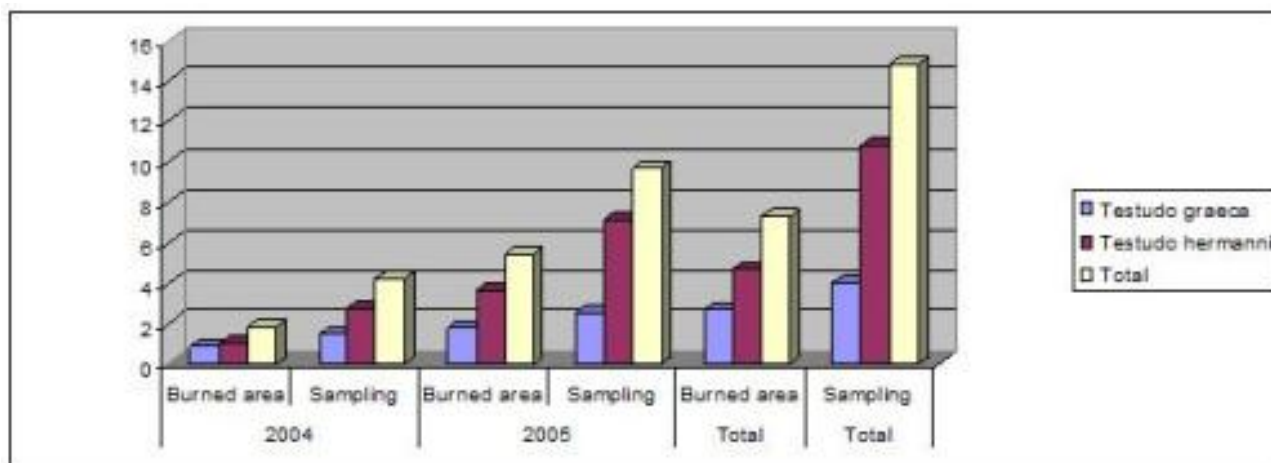
- Data for 2004: total of 170 individuals from the two species observed in the burned area, 140 were found dead, 30 alive. In percents: 82.35 % dead and 17.65 % alive. Recapitulation of data for the same area for the period 2004-2005 is as follows: total 241; dead 153; alive 88; same data in percents: dead 63.49 %; alive 36.51 %.
- Comparison of data for the two tortoise species in burned area and sampling area based on number of individuals on 1000 linear meters is shown in table 1.

Table 1. Number of *T. hermanni* & *T. graeca* on 1000 linear meters.

Species	2004		2005		Total	
	Burned area	Sampling	Burned area	Sampling	Burned area	Sampling
<i>Testudo graeca</i>	0,8881	1,4546	1,764	2,542	2,6521	3,9966
<i>Testudo hermanni</i>	1,0006	2,7646	3,654	7,134	4,6546	10,788
Total	1,887	4,2192	5,418	9,676	7,3067	14,7846

Fig. 2.

Number of *T. hermanni* & *T. graeca* on 1000 linear meters.



- Totally different is the data for the same species after the fire in Ostar Kamak village, where the fire was low (with low intensity). Of the 13 found individuals in the burned area one is dead, the other 12 – alive. Proportionally this is 7.7% dead (death rate) and 92.3% alive.
- At two of the surveyed territories near Gorno Lukovo village and Kostilkovo Village after the fires some activities were taken by the forestry enterprise in order to clear the burned

wood, ploughing the soil and forestation with untypical sorts of vegetation. Such activities had a disastrous effect on the two tortoise species, since on one hand the woodcutters used them on a mass scale for food, and on the other hand the habitat is utterly changed plus the fact that tortoises die easily when the soil is ploughed. At Kostilkovo Village the death rate of tortoises is 100%. Identical is the situation in Gorno Lukovo village, where live individuals were localized only in areas, without any intensive forestry enterprise's activities (hard of access ravines).

- Apart from the negative effect on the two tortoise species, the fires have fatal impact on all other representatives of the herpetofauna and especially on slow-moving species. Gathered and analyzed data is presented in Appendix 2.

1.2 Conclusions and recommendations:

1. Direct influence of fires had strong negative effect on the two tortoise species populations *Testudo hermanni* and *Testudo graeca* in the Eastern Rhodopes Mountain, as well on all other representatives of the herpetofauna.
2. Gathered data for tracing the tendency and the temps of regeneration of the two tortoise species populations is insufficient for specific conclusions. Along these lines, it is necessary to continue this research and to enrich the information available up to now.
3. The forestry activities (cleaning of burned wood, ploughing and forestation with untypical sorts as: European Black Pine (*Pinus nigra*), Scots pine (*Pinus sylvestris*), Cedar of Lebanon (*Cedrus libani*), Arizona cypress (*Cupressus arizonica*) и др.) resulted in extermination of tortoises on huge areas in the Eastern Rhodopes Mountain. Unfortunately these activities are still in progress, it is necessary to continue the work with the experts from National Forestry Directorate and to lobby for alteration of these negative procedures.
4. Hiring of gypsies as woodcutters is another big problem for tortoises. Out of 15 woodcutters' camps checks last year, in 10 were found scraps of eaten tortoises. It is necessary to keep high level of control and constant work with local structures of Regional Department of Forestry and RIEW.

1.3 Carrying out two seminars with local authorities and communities for the two species' conservation problems

Within the framework of the project two meetings have taken place, aiming to improve the partnership and coordination with local communities and also one meeting with the National Work Group on Conservation of Amphibians and Reptiles.

1.1.1 Organization and implementation of workshops with local communities:

First workshop was held on 30th June 2005 in Kardjali (Eastern Rhodopes Mountain). This workshop was hosted also by Regional Department of Forestry – Kardjali.

During the workshop, training to 20 employees of mobile forestry guard-service, police stations and municipalities was done. Harmonization was achieved of the activities of different controlling authorities for the protection of tortoises and specific arrangements were taken towards cooperative realization and assistance for accomplishment of all activities connected with this project.

At the meeting there were representatives of the local communities, the controlling authorities and NGOs, interested in these matters: Municipality of Kardjali and municipality of Ivaylovgrad, RIEW – Haskovo, Regional Department of Forestry – Kardjali, State Forestry Offices – Haskovo, Kardjali, Krumovgrad, Momchilgrad, Regional Office of interior affairs – Haskovo and Kardjali,

National Service Border Police (NSBP), as well as local non-governmental organizations, Rhodopes Project, which is part of UN's program for development and media.

1.1.2 Review of the results:

- All presented parties engaged with specific activities aiming to solve the problems of the two tortoise species protection on local base.
- A decision was taken at least 5 large-scale examinations to be realized together with representatives of the control authorities and NGOs working on tortoise poaching counteraction in the Eastern Rhodopes.

The second workshop was held on 16th and 17th May 2006 with the financial co-assistance of "Rodope" Project that is part of UNDP. 22 representatives of local communities took part in the meeting, as well as some of the participants from the first workshop. Emphasis was put on solving special cases dealing with conservation of biodiversity and, in particular, for the two tortoise species in the area of the Eastern Rhodopes. The results from the survey were presented and discussed in detail, especially the theme of alteration of forestry activities in territories of importance for the tortoises. This meeting resulted in: Introducing the National Action Plan for tortoise conservation, with special attention to the problems of tortoise protection, to the local authorities; Better coordination between local authorities in all activities for conservation of the two species in the region and poaching prevention.

1.4 Organization and implementation of workshops of the National Work Group for Conservation of Amphibians and Reptiles in Bulgaria.

On 11th February 2006 as part of the project, the 6th workshop of the National Work Group for Conservation of Amphibians and Reptiles took place. The meeting was organized by BSBP – Plovdiv, in cooperation with NMNHS-BAS. 28 representatives from: state institutions as RIEW (Smolyan, Sofia, Montana, Ruse, Haskovo, Blagoevgrad, Pazardjik, Stara Zagora, and Burgas), NMNHS-BAS, NGOs (BSPB, Bulgarian Herpetological Society, Green Balkans, Balkans, Bulgarian foundation "Biodiversity"), Plovdiv University "Paisii Hilendarski", and "Rodope" Project - UNDP took part in the meeting.

Basic aim of the work group, as well as this of the meeting is to unite the efforts and coordinate the work of all interested institutions and leading experts for the conservation and research of Amphibians and reptiles in Bulgaria.

1.5 Joint checks with the control institutions on poaching and illegal trading

During the project time-frame 18 control checks have been organized and realized, together with representatives of RIEW–Haskovo and RIEW-Plovdiv, Regional Department of Forestry – Kardjali,



Police Departments – Haskovo and Kardjali, Border Police – Smolyan and BSPB. As a result of these checks 17 penalty acts had been issued, based on the written statements from the checks.

1.6 Nature conservation lectures and training activities for pupils from the region.

Training activities originating from “Conservation of World-wide Threatened tortoises *Testudo graeca* & *Testudo hermanni* in the Eastern Rhodopes Mountain, Bulgaria” include organization and realization of series of lectures, focused on two groups – students from universities and pupils. The educational program for the universities is realized with the partnership of Faculty of Biology, Plovdiv University. During the university students` program were realized 8 lectures on environmental themes. Lectures took place every two weeks and were supported by multimedia presentations. Guest-lecturers were some of the best experts in conservation and research of different groups of vertebrates and plants in Bulgaria. Prominence was given to the conservation of tortoises.



Ecology, biology, environmental status, threats to both species and the measures taken to protect them can be seen in two presentations. More than 240 people including students, lecturers and other people interested in nature conservation visited the lectures.

15 lectures on nature conservation, with accent on conservation of amphibians and reptiles, as well as on other components of the biodiversity in Bulgaria, were presented to pupils and teachers in schools in Plovdiv and the region, in accordance with the activities planned in the project.



The lectures were read in different schools in Plovdiv, one school in Pazardjik, one in Panagyurishte and one in Strelcha, the last three presentations were organized with the assistance of RIEW-Pazardjik.

More than 380 pupils and 15 teachers attended the lectures. The organization of lectures was subject of agreement with RDE of Ministry of Education. All lectures are accompanied with slides and multimedia presentations. 7 active members of BSPB – Plovdiv, joined their realization. Lecture in “Protected amphibians and reptiles in Bulgaria” was read at the invitation of the PR of RIEW –Haskovo in April, in front of 12 selected pupils from the town who are interested in environment protection. An expert from BSPB – Plovdiv read the lecture.



During 10-20 July 2005 in Ivaylovgrad and Madjarovo were done 4 field trainings on monitoring the number of tortoises with the participation of pupils from 5th to 8th grade. The trainings included theoretical presentation for differentiation of the two tortoise species, threats, biology, ecology, and practice on application of the theoretical knowledge in field. 16 pupils from Ivaylovgrad and 8 from Madjarovo took part in the training.

On 4th July 2006 during the environmental camp “Kartali 2006”, organized by BSPB in the area of the Eastern Rhodopes (town of Madjarovo) was organized one-day field training to pupils and university students on identifying the species in nature and monitoring of the two tortoise species. 5 participants with strong interests in herpetology were included in the training.

1.7 Carrying out a campaign for local communities

1.7.1 Publishing of color poster:

A team of experts was formed to work out the idea and the design of the poster for the conservation of tortoises. The team summed up and interpreted the number of ideas and suggestions that were result from the discussions in the mailing list – testudo.bg with more than 300 people interested in conservation of tortoises.

In the beginning of July a full colored poster was printed in 4000 copies, as the additional copies became a fact, thanks to the co-financing of “Ekoobshtnost “Foundation.

1.7.2 Publishing of color brochure:

The brochure consists of short information on the biology, ecology, environmental status, and the problems for the conservation of the two tortoise species in Bulgaria and the specific activities and the results obtained by this project.



It consists of 16 pages and is printed in 1000 copies. Distribution will be done between partner institutions, organizations, interested representatives of the local authorities and potential sponsors.



1.7.3 Distribution of the information materials:

Immediately after the poster was printed, its planned distribution started. During the project two large-scale campaigns were realized for its distribution. First one was in the beginning of August 2005, the second one – in April 2006. Posters have been distributed all over the territory of the municipalities in the Eastern Rhodopes, so that 90% of the areas where tortoises are met have been postered. Municipalities with distributed posters:

1. Harmanli
2. Kardjali
3. Chernoochene
4. Krumovgrad
5. Ivaylovgrad
6. Madjarovo
7. Momchilgrad
8. Mineralni bani

12 volunteers took part in the distribution; total number of visited settlements during the two campaigns is more than 400.

The poster is also delivered on formal and informal meetings with the institutions to each state forestry on the territory of the Eastern Rhodopes, RDF-Kardali, RIEW – Haskovo as well as in the police departments in Haskovo and Kardjali.

Printed stuff is distributed in schools all over the country, and mostly in the region of the Eastern Rhodopes.

Observation during the distribution process shows that it was accepted with interest and thus contributes to the knowledge of population with regards to conservation of tortoises.

1.7.4 Media campaign:

In order to present the activities and the results obtained from the project, there are 60 articles in regional and national press, 5 radio and 7 TV broadcasts.

Special material was put in air in national radio “Darik”, with the start of the project on 11 June 2005, presenting it and its activities to the listeners, as well as the problems that triggered its establishment.

List of part of publications in the press:

➤ Printed media

1. “Standard” Newspaper, issue 4466, 15.06.05. p.7
2. “Haskovska Maritsa” Newspaper, issue 137, 15.06.05, p.2
3. “Haskovska Maritsa” Newspaper, issue 141, 20.06.05, p.2



4. "Haskovska Maritsa" Newspaper, 23.06.05, стр.7
5. "Haskovska Maritsa" Newspaper, issue 151, 01.07.05, p.4
6. "Nov Jivot" Newspaper, issue 123, 1-4.07.05, p.1
7. "Novinar Jug" Newspaper, issue 130, 06.07.05, p.2
8. "Haskovska Maritsa" Newspaper, issue 155, 06.07.05, p. 2
9. "Haskovska Maritsa", newspaper, issue 163, 15.07.05, p. 1, p.3
10. "Novinar Jug" Newspaper, issue 137, 15.07.05, p. 3
11. "Perperikon" Newspaper, issue 26, 11-17.07.05, p.12
12. "Haskovska Maritsa" Newspaper, issue 179, 03.08.05, p. 1, p.2
13. "Novinar Jug" Newspaper, 03.08.05, p.3
14. „Ecosviat" Magazine year V, issue 1/2006 г.
15. „Sega" Newspaper, 01.02.2006
16. "Haskovska Maritsa" Newspaper, issue 54, 07.03.2006г., p.3,4
17. Novinar Jug" Newspaper, issue 88, 05.05.2006., p.1
18. "Nov Jivot" Newspaper, issue 88, 16.05.2006., p.1
19. "Novinar Jug" Newspaper, issue 95, 16.05.2006., p.3
20. "Haskovska Maritsa" Newspaper, issue.119, 22.05.2006., p.2
21. "Chernomorski far" Newspaper, 04.06.2006
22. "Haskovska Maritsa" Newspaper, issue 143, 21.06.2006., p.2
23. „Monitor" Newspaper 22.06.2006.
24. "Nov Jivot" Newspaper, issue 124, 06.07.2006., p.2

➤ Radio Broadcasts

1. Darik" Radio, 11.06.2005.
2. "Horizont Radio", 23.08.2005.
3. "Darik" Radio, 22.08.2005.
4. "Darik" Radio each broadcasted press-release is also published at www.darik.net
5. "Vesselina" Radio (news programme)

➤ E-publications and internet pages

1. BlueLink e-bulletin, Daily Digest from BlueLin, 19.07.2005.
2. BlueLink e-bulletin, Daily Digest from BlueLin, 21.07.2005.
3. BlueLink e-bulletin, Daily Digest from BlueLin, 03.08.2005.
4. BlueLink e-bulletin, Daily Digest from BlueLin, 23.08.2005.
5. BlueLink e-bulletin, Daily Digest from BlueLin, 21.06.2006.
6. e-newspaper „Sega" 30.01.2005.
7. e-newspaper „Nova Dobrudjanska Tribuna", 16.04.2005.
8. e-newspaper "Nova Dobrudjanska Tribuna", 14.06.2005.
9. e-newspaper „farmer.bg", 15.06.2005.
10. e-newspaper e-media BIG.BG, 15.07.2005.

11. E-Media „BIG.BG” 15.7.2005.
12. e-newspaper „Dnes+” 02.08.2005.
13. e-newspaper „Dnes +”, 02.08.2005.
14. e-newspaper „bgfactor”, 03.08.2005.
15. e-newspaper „news.bg”, 19.08.2005.
16. e-newspaper „news.bg”, 19.08.2005.
17. e-newspaper „Sega”, 01.02.2006.
18. E-Media „BIG.BG” 22.06.2006.

All news is published in due time at the e-pages of BSBP: www.bspb.org; <http://testudo.bspb.org/> and www.riosvhs.org. The information was also sent to the unique Bulgarian Herpetological mailing list testudobg.



Note: There exists the possibility some of the information issued by us to be published or broadcasted in other media without our knowledge or consent

2 Conclusions

As a result of the conducted field survey of the fire impact on tortoises's populations 6 burned territories have been researched together with the sampling territories (16 426 decares). 3 experts and 10 trained-in-advance volunteers took part in the survey, totally 114 man-days at field. The degree of fire impact on tortoises` and other amphibians` and reptiles` populations was established. It was proved that the implemented after-fire forestry activities (cleaning of burned wood, ploughing and forestation with untypical vegetation) resulted in severe changes in habitats` types and to destruction of tortoises in huge territories in the Eastern Rhodopes Mountains. Gathered data for tracing the tendency and the temps of regeneration of the two tortoise species populations is insufficient for specific conclusions.

During the two meetings on regional level, partnership and coordination between local communities, controlling authorities and NGOs have been optimized. 20 employees of the mobile forestry guards, The Police and Municipalities have been trained. Specific cases dealing with tortoises' conservation on the territory of the Eastern Rhodopes Mountain were analyzed. The results from the survey were presented and discussed in details; special attention was put on the possibilities of alteration of forestry activities at territories, important to tortoises. The National Action Plan for tortoise conservation was presented to the local authorities. Specific arrangements were made for the cooperative realization of priority activities from the National Action Plan on local ground.

During the meeting of the National Work Group for Conservation of Amphibians and Reptiles the progress of different institutions and NGOs in research and protection of the herpetofauna was pictured. Subject to coordination and considered for realization for the next year were specific priority actions and activities.

As a result from the 18 joint examinations at 32 places, found cases of poaching were 23, 17 persons were brought under penalty account, 112 confiscated and voluntarily delivered tortoises were put back into natural habitats.

As a result from all 8 educational lectures at universities, 9 in gymnasiums and primary schools, environmental awareness amongst 632 students and pupils and 15 teachers was raised, cooperation with 5 institutions was conducted and 7 volunteers were trained. 15 new members joined the BSPB.

As a result from the field practice on identification and monitoring of the two tortoise species, 24 pupils from local Eastern Rhodopes Mountain Communities were trained, together with 5 students, interested in herpetology.

Following the organized information campaign full-coloured poster in 4000 copies was printed. Half of the copies were printed with the help of co-financing body. The poster has been distributed to 8 key places in the territory of the municipalities in the Eastern Rhodopes, so that 90% of the areas where tortoises are met have been postered. 7 volunteers took part in its distribution.

A brochure in 1000 copies was printed and distributed. It consists of information on the conservation of the two tortoise's species and measures taken for their protection.

In order to expand the environmental culture and knowledge on the conservation of tortoises' problems, there are 60 articles in regional and national press, 5 radio and 7 TV broadcasts, all based on information from the BSPB.

3 Next steps

In consequence of the results achieved by the field survey, a lot of problems on tortoise's conservation become clear, for which specific activities should be undertaken, as well as continuation of some of the current activities. Actions planned for the next year are:

- To continue the survey of fire impact on the two species and enrich the available data. Gathered data for tracing the tendency and the temps of regeneration of the two tortoise species populations is insufficient for specific conclusions.
- Make a lobby with experts on national level from National Forestry Directorate and other interested parties for the alteration of forestry activities with ones, conserving the biodiversity and protecting important habitats.
- Proclaim as protected areas that are of extreme importance and usual habitats for the conservation of the two species.
- Conducting joint examinations with local structures of Regional Department of Forestry and RIEW for implementation of environment protection law and counteractions against tortoises' poachers.
- Educational activities in coordination with local authorities and communities on poaching counteractions and conservation of tortoises.
- To broaden educational activities with students of different age groups.
- Publication of popular science book on the two tortoise species.
- Continuation and expansion of appearance on national and regional e-media and printed media, as well as <http://testudo.bspb.org/> support and actualization.

4 Financial Report

Budget lines	Items	Total cost GBP	Total cost BGN	Expenses BGN	Budget BGN	Budget GBP
Research of the fire impact						
Accommodation	man days (184 md x 4,29 GBP)	787,86	2206,01	2142,98	63,03	22,51
Fuel	litres (806 l. A 92 H x 0,44 GBP)	354,64	992,99	1053,90	-60,91	-21,75
Study director	Fee	90,00	252,00	252,56	-0,56	-0,20
Amount I		1232,5	3451,00	3449,44	1,56	0,56
Joint checks with the control institutions						
Travel costs	number of tickets	35,71	99,99	81,01	18,98	6,78
Fuel	litres (104 l. A 92 H x 0,44 GBP)	45,76	128,13	120,29	7,84	2,80
Accommodation	man days (32 md x 4,29 GBP)	138,6	388,08	419,40	-31,32	-11,19
Amount II		220,07	616,20	620,70	-4,50	-1,61
- Conservation lectures and training activities for pupils						
Accommodation	man days (100 md x 4,29 GBP)	429,00	1201,20	1270,21	-69,01	-24,65
Travel costs	number of tickets	178,57	500,00	404,04	95,96	34,27
Amount III		607,57	1701,20	1674,25	26,95	9,62
Information campaign						
• Colour poster	2000 copies	464,29	1300,01	1267,00	33,01	11,79
• Colour brochure	2000 copies	321,43	900,00	708,80	191,20	68,29
• Distribution of information materials						
Accommodation	man days (32 md x 4,29 GBP)	125,00	350,00	419,74	-69,74	-24,91
Travel costs	number of tickets	196,43	550,00	553,31	-3,31	-1,18
Amount IV		1107,15	3100,02	2948,85	151,17	53,99
Carrying out two seminars						
Hall rent	2 halls	71,43	200,00	0,00	200,00	71,43
Accommodation	50 participants	178,57	500,00	498,69	1,31	0,47
Travel expenses	number of tickets	107,14	299,99	506,41	-	206,42
Amount V		357,14	999,99	1005,10	-5,11	-1,82
Car maintenance		107,14	299,99	533,61	-	233,62
Amount VI		107,14	299,99	533,61	-	233,62
Administrative						

Budget lines	Items	Total cost GBP	Total cost BGN	Expenses BGN	Budget BGN	Budget GBP
Communication (internet)	12 months	68,57	192,00	120,00	72,00	25,71
Communications (postage, telephone)	12 months	257,00	719,60	765,68	-46,08	-16,46
Office consummative	12 months	250,00	700,00	634,67	65,33	23,33
Electricity	12 months	42,86	120,01	115,36	4,65	1,66
Amount VII		618,43	1731,60	1635,71	95,89	34,25
Equipment						
GPS	1 GPS	250,00	700,00	868,00	-	-60,00
Amount VIII		250,00	700,00	868,00	-	-60,00
Overhead						
Amount IX		500,00	1400,00	1264,34	135,66	48,45
TOTAL PROJECT COSTS		5000	14000	14000	0,00	0,00

5 Appendices

Methodology

Methodology used:

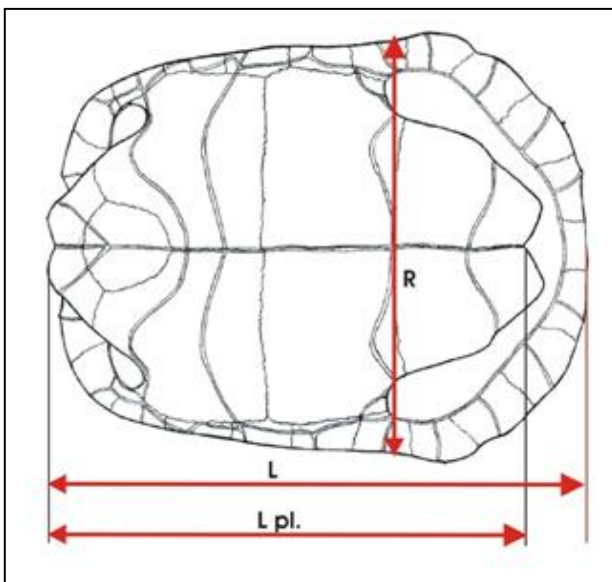
The current survey of fires impact on the two tortoise species Herman's Tortoises (*Testudo hermanni boettgeri* Mojsisovics, 1889) & Spur-thighed Tortoises (*Testudo graeca ibera* Pallas, 1814.) was conducted in the region of the Eastern Rhodopes Mountains at 6 burned areas, with fires at different time periods (95/96, 2000, 2003 and 2004.) and 6 sampling territories. (Table 1.). Each territory was visited three times (spring/summer/autumn), and for the analysis only data gathered in correct weather conditions were taken. Information was gathered by the transect method and Capture/Recapture. Each transect was carefully marked with GPS system, and the relative length was taken in linear meters. For each tortoise (dead or alive) the following facts were taken:

- Correct GPS coordinates (x; y; z);
- Description of the habitat type;
- Sex (male, female or juvenile);
- Age in years (whenever possible);
- Weight (measured with electronic scales up to 5 grams);
- Dimensions of the tortoise – length of the whole tortoise, length of the breast-plate, width and height (on fig. 2);
- Digital photo of each tortoise.

Table 1

Surveyed burned areas included in the research.

N	Built-up area close to the fire	Year of fire	Burned area in decares	Latitude	Above-sea level in meters
1.	Dositievo	2004	639	N41.91882 E25.98574	181
2.	Kolets	2003	3521	N41.86729 E25.32170	412
3.	Ostar Kamak	2003	2349	N41.87755 E25.84613	230
4.	Kostilkovo	2000	552	N41.42819 E26.06712	328
5.	Gorno Lukovo	1996	771	N41.37030 E26.11011	183
6.	Gorno Briastovo	1996	381	N41.93201 E25.28807	412
7.	Total		8213		

Fig. 2. Measurements of tortoises

1) *Testudo graeca iberica* Pallas from the side of the breast-plate, where : **L pl.** – length of breast-plate, **L** – length of tortoise, **R** – width by two neighboring eighth peripheral shields.

Marking and recapture:

Each captured individual of the two tortoise species (*Testudo hermanni*) & Spur-thighed (*Testudo graeca*) is measured (**L pl.** – length of breast-plate, **L** – length of tortoise, **R** – width by two neighboring eighth peripheral shields and **H**- height of tortoise taken in the middle, fig. 2), measures were taken with 1mm trammel head allowance. Each individual was marked by the method of Bury & Luckenbach (1977). Marking is made with the help of small handsaw, as small cut is made in the free peripheral spurs that should go to the bone, not deeper, until blood is seen. If only the horn is cut, it restores quickly with the growing of the tortoise and thus marking is lost. Units column is put at the right, decimals are on the left. There are 1499 unique combinations, if all spurs are used. Accurate account and marking of individuals is made with GPS and data is entered in e-map MapSource. Thus, seasonal migrations of tortoises can be observed as well as entry of individuals in areas with fires and a lot of extra ecological parameters.

Table 2. Species observed in the region of Kolets, season 2004, number of individuals on 1000 linear meters, burned and sampling areas

N	Species	Number of individuals on 1000 linear meters, Spring watch		Number of individuals on 1000 linear meters, Summer watch		Number of individuals on 1000 linear meters, Autumn watch		Total	Total
		Burned area	Sampling area	Burned area	Sampling area	Burned area	Sampling area	Burned area	Sampling area
1.	<i>Triturus vulgaris</i>	0.5505	1.294	0.9504	0	0	0	1.5009	1.294
2.	<i>Bufo bufo</i>	0.4588	0.0863	0	0	0	0	0.4588	0.0863
3.	<i>Bufo viridis</i>	0	0.2588	0	0	0	0	0	0.2588
4.	<i>Rana ridibunda</i> ¹	0.5505	2.1567	0.1584	0.7224	0.6451	0	1.354	2.8791
5.	<i>Bombina variegata</i> ¹	0.9634	1.294	1.188	0.7224	1.6129	1.8969	3.7643	3.9133
6.	<i>Hyla arborea</i> ²	0.0918	0.2588			0	0	0.0918	0.2588
7.	<i>Testudo graeca</i>	0.4129	0.9489	0.4752	0.5057	0	0	0.8881	1.4546
8.	<i>Testudo hermanni</i>	0,367	1.8979	0.6336	0.8667	0	0	1,0006	2.7646
9.	<i>Podarcis taurica</i>	0.367	0.1725	0	0	0	0	0.367	0.1725
10.	<i>Podarcis muralis</i>	0	0.0863	0	0	0	0	0	0.0863
11.	<i>Lacerta trilineata</i>	0.505	0.1725	0.5544	1.373	0.6452	0.94845	1.7046	2.49395
12.	<i>Lacerta viridis</i>	3.9455	10.1784	6.3361	9.5369	2.5806	4.11	12.8622	23.8253
13.	<i>Coluber caspius</i>	0.0459	0	0.0792	0.1445	0	0.3161	0.1251	0.4606
14.	<i>Elaphe sauromates</i>	0.0459	0	0	0	0	0	0.0459	0
15.	<i>Natrix natrix</i>	0	0	0	0.0722	0	0	0	0.0722
16.	<i>Vipera amodites</i>	0.0459	0	0	0	0	0	0.0459	0
17.	Total:	15.9831	18.8051	10.3753	13.9438	5.4838	7.27145	31.8422	40.02035

¹ - Counting of these species in water basins is impossible, so data in this table is for isolated individuals.

² - Identification of species is also made by sounds, but data in table is only for observed individuals.

Table 3. Species observed in the region of Kolets, season 2005, number of individuals on 1000 linear meters, burned and sampling areas

N	Species	Number of individuals on 1000 linear meters, Spring watch		Number of individuals on 1000 linear meters, Summer watch		Number of individuals on 1000 linear meters, Autumn watch		Total burned areas	Total of sampling areas
		Burned area	Sampling area	Burned area	Sampling area	Burned area	Sampling area		
1.	<i>Triturus vulgaris</i>	2.292	0.999	1.42	2.342	0	0	3.712	3.341
2.	<i>Bufo viridis</i>	0.099	0.091	0	0	0	0	0.099	0.091
3.	<i>Rana ridibunda</i> ¹	0.997	1.999	1.278	2.037	2.638	2.667	4.913	6.703
4.	<i>Rana dalmatina</i>	0	0	0.071	0	0	0.444	0.071	0.444
5.	<i>Bombina variegata</i> ¹	0.997	2.272	1.065	2.241	0	0	2.062	4.513
6.	<i>Hyla arborea</i> ²	0.793	0.272	0	0	6	4.444	6.793	4.716
7.	<i>Testudo graeca</i>	1.196	1.727	0.568	0.815	0	0	1.764	2.542
8.	<i>Testudo hermanni</i>	1.595	4.181	2.059	2.953	0	0	3.654	7.134
9.	<i>Emis orbicularis</i> ¹	0.099	0	0.071	0	0	0	0.17	0
10.	<i>Lacerta trilineata</i>	1.993	2.181	2.201	3.259	4.749	5.778	8.943	11.218
11.	<i>Lacerta viridis</i>	12.657	17.27	6.036	9.167	12.662	16.444	31.355	42.881
12.	<i>Ophisaurus apodus</i>	0.099	0	0	0.102	0	0	0.099	0.102
13.	<i>Coluber caspius</i>	0	0.181	0.284	0.102	0	0	0.284	0.283
14.	<i>Elaphe q. sauromates</i>	0	0.091	0	0	0	0	0	0.091
15.	<i>Natrix natrix</i>	0	0.181	0	0	0.528	0	0.528	0.181
16.	<i>Vipera amodites</i>	0	0	0.071	0.102	1.583	0.444	1.654	0.546
17.	Total	22.817	31.445	15.124	23.12	28.16	30.221	66.101	84.786

¹ - Counting of these species in water basins is impossible, so data in this table is for isolated individuals

² - Identification of species is also made by sounds, but data in table is only for observed individuals.

Table 4. Species observed in the region of Ostar Kamak village, season 2004, number of individuals on 1000 linear meters, burned and sampling areas

N	Вид	Number of individuals on 1000 linear meters, Spring watch		Number of individuals on 1000 linear meters, Summer watch		Number of individuals on 1000 linear meters, Autumn watch		Total of burned areas	Total of sampling areas
		Burned area	Sampling area	Burned area	Sampling area	Burned area	Sampling area		
1.	<i>Bufo bufo</i>	0	0.165	0	0	0	0	0	0.165
2.	<i>Bufo viridis</i>	0	0.4126	0	0	0	0	0	0.4126
3.	<i>Rana ridibunda</i> ¹	0.7379	1.2377	0.3002	2.1277	3.4782	4.3478	4.5163	7.7132
4.	<i>Hyla arborea</i> ²	0.4304	2.2279	0	0.851	0.5797	1.3043	1.0101	4.3832
5.	<i>Testudo graeca</i>	0.2459	0.0825	0	0	0	0	0.2459	0.0825
6.	<i>Testudo hermanni</i>	0.4919	1.2377	0	0	0	0	0.4919	1.2377
7.	<i>Emys orbicularis</i> ¹	0.1223	0.495	0	0	0	0	0.1223	0.495
8.	<i>Cyrtopodion kotshyi</i>	0	1.2377	0	0	0	0	0	1.2377
9.	<i>Ophisaurus apodus</i>	0.1845	0.5776	0	0	0	0	0.1845	0.5776
10.	<i>Podarcis taurica</i>	3.9356	4.7033	2.402	5.5319	2.3188	4.3478	8.6564	14.583
11.	<i>Lacerta trilineata</i>	0.5534	0.7426	0.4504	2.1277	0.8695	1.7391	1.8733	4.6094
12.	<i>Lacerta viridis</i>	7.01	12.0471	4.5038	13.617	6.0869	13.0435	17.6007	38.7076
13.	<i>Ablepharus kitaibeli</i>	0.0615	0.2475	0	0	0	0	0.0615	0.2475
14.	<i>Coluber caspius</i>	0.1845	0.165	0	0	0	0	0.1845	0.165
15.	<i>Elaphe q. sauromates</i> <i>Malpolon</i>	0	0.165	0	1	0	0	0	1.165
16.	<i>monspessulanus</i>	0	0.0825	0	0	0	0	0	0.0825
17.	<i>Natrix natrix</i>	0.0615	0.165	0	0	0	0	0.0615	0.165
18.	<i>Vipera ammpdytes</i>	0	0.0825	0	0	0	0	0	0.0825
19.	Total	14.0194	26.0742	7.6564	25.2553	13.3331	24.7825	35.0089	76.112

¹ - Counting of these species in water basins is impossible, so data in this table is for isolated individuals.

² - Identification of species is also made by sounds, but data in table is only for observed individuals.

Table 5. Species observed in the region of Ostar Kamak village, season 2005, number of individuals on 1000 linear meters, burned and sampling areas

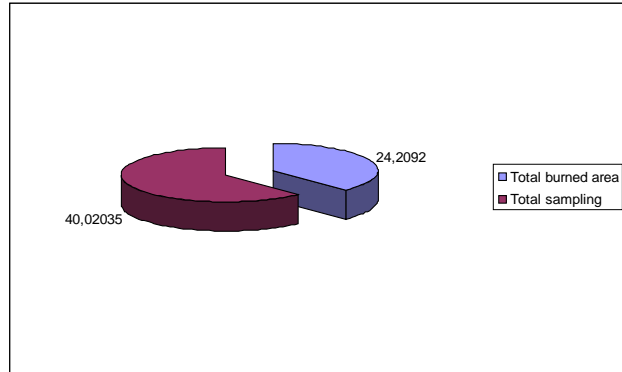
N	Species	Number of individuals on 1000 linear meters, Spring watch		Number of individuals on 1000 linear meters, Summer watch		Number of individuals on 1000 linear meters, Autumn watch		Total of burned areas	Total of sampling areas
		Burned area	Sampling area	Burned area	Sampling area	Burned area	Sampling area		
1.	<i>Bufo viridis</i>	0	0	0.1672	0	0	0	0.1672	0
2.	<i>Rana ridibunda</i> ¹	0.222	0.5415	1.0034	0.8969	0.8652	2.17	2.0906	3.6084
3.	<i>Rana dalmatina</i>	0	0	0	0	0.2884	0.434	0.2884	0.434
4.	<i>Hyla arborea</i> ²	0.444	0.5415	0.1672	1.57	0.2884	0.434	0.8996	2.5455
5.	<i>Testudo graeca</i>	0.111	1.6246	0.3345	0	0	0	0.4455	1.6246
6.	<i>Testudo hermanni</i>	0.7771	1.6246	0.3345	0.6727	0	0	1.1116	2.2973
7.	<i>Emis orbicularis</i> ¹	0	0.5415	0	0.6727	0	0	0	1.2142
8.	<i>Lacerta trilineata</i>	0.8881	3.5199	2.1741	2.018	2.019	3.4727	5.0812	9.0106
9.	<i>Lacerta viridis</i>	13.6526	27.3467	10.5362	14.126	8.3644	10.4182	32.5532	51.8909
10.	<i>Podarcis taurica</i>	4.885	8.1228	4.181	4.4845	6.057	5.6432	15.123	18.2505
11.	<i>Ablepharus kitaibelii</i>	0.9991	5.4152	0	0	1.731	3.0387	2.7301	8.4539
12.	<i>Ophisaurus apodus</i>	0.6661	1.6245	0	0	0	0	0.6661	1.6245
13.	<i>Coluber caspius</i>	0.333	0	0	0	0.2884	0.8681	0.6214	0.8681
14.	<i>Elaphe q. sauromates</i> <i>Malpolon</i>	0	0	0	0	0	0	0	0
15.	<i>monspessulanus</i>	0	0	0	0	0	0.434	0	0.434
16.	<i>Vipera amodites</i>	0	0.5416	0	0	0	0	0	0.5416
17.	Total	22.978	51.4444	18.8981	24.4408	19.9018	26.9129	61.7779	102.7981

¹ - Counting of these species in water basins is impossible, so data in this table is for isolated individuals.

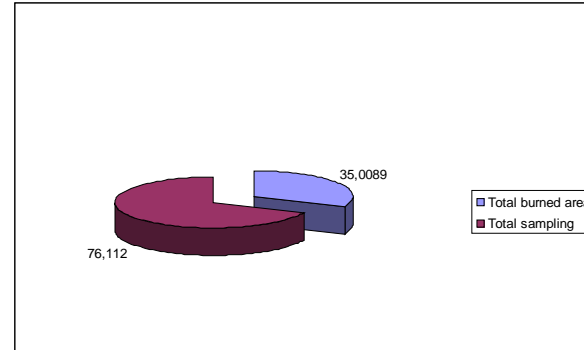
² - Identification of species is also made by sounds, but data in table is only for observed individuals

Fig. 3. Obtained results - graphical presentation.

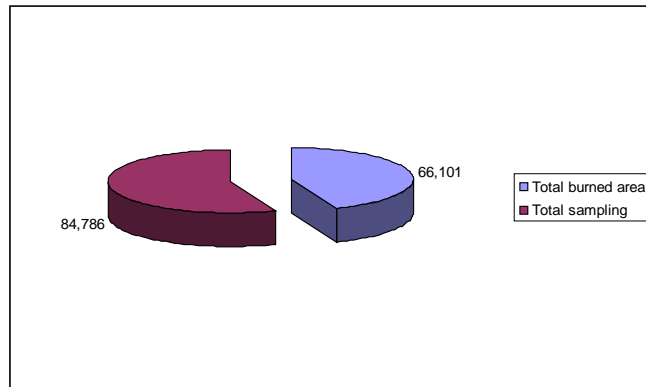
Species observed in the region of Kolets, season 2004, number of individuals on 1000 linear meters, burned and sampling areas



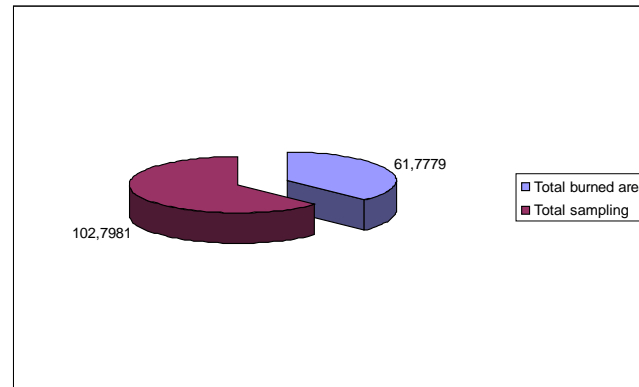
Species observed in the region of Ostar Kamak village, season 2004, number of individuals on 1000 linear meters, burned and sampling areas



Species observed in the region of Kolets, season 2005, number of individuals on 1000 linear meters, burned and sampling areas



Species observed in the region of Ostar Kamak village, season 2005, number of individuals on 1000 linear meters, burned and sampling areas



These results clearly point the overall negative impact of fires on the Herpetofauna, which is in different levels for the different species, and most damaged are the two tortoise species (*Testudo hermanni* & *Testudo graeca*), the green lizard (*Lacerta viridis*), the Crimea lizard (*Podarcis taurica*) and the short-legged lizard (*Ablepharus kitaibelii*). Graphics clearly show the differences in the numbers of species in burned and sampling territories, namely the much higher density of populations in sampling areas than in burned areas.