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The Hermann tortoises preserving the flag specie for south-west Romania

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Final Report

Report compiled by Laurentiu Rozylowicz
Project web page: www.portiledefier.ro/carapax

Bucharest, November 2007

Executive Summary

The tortoise population is declining in Romania due to the habitats degradation, killings caused by the people, cropping for pets etc. The mortality is amplified by the species' biology. The project aim is to improve the institutional level of protection and to raise population awareness on *Testudo hermanni* importance.

The conservation activities was be performed through: obtaining information on the patterns of territory usage by tortoises; completing the tortoises' distribution pattern by including bioclimatic parameters; recommendations on the establishment of a network of protected areas in South-western Romania; the development of a raising awareness campaign in the vulnerability areas.

The project aim is to improve the degree of knowledge on the species threats, the institutional level of protection and to raise population awareness on species importance.

The extension of the conservation activities was be performed through: obtaining information on the patterns of territory usage by tortoises in order to estimate the habitats isolation degree; completing the tortoises distribution pattern in Romania by including bioclimatic parameters; recommendations on the establishment of a new protected areas network in South-western Romania for tortoises protection; the development of a raising awareness campaign in the vulnerability areas.

The mapping performed until now had shown the fact that the authorities have not considered the tortoises when they have established the existing network of protected areas. More than 85% of the network overposes to forest, although majority of protected species are pasture species. The data on the territory and tortoises activity was presented to the partner environmental authorities, in order to declare some new protected areas for this species. These were submitted as a park zoning solution. The protection action plan has revealed the fact that the tortoise has become a species whose importance and vulnerability is not entirely known by the local population.

Determining the Hermann's tortoise activity and territory

The conservation activities can be properly designed when we hold data on population's ecology such as territory and activity. The protected areas extension and the reduction of threats are more effective when these data are available. The project funded by RSG aimed to identify the size of the mature tortoises, tortoise's behaviour; maximal distances the tortoises cover, the relationships between the territory and environmental factors.

The fieldwork was performed between June 2006 and October 2006 and May 2007 and October 2007, in 10-days intensive monitoring sessions each month. The transmitters were installed on tortoises that are using habitats selected on the following criteria: grasslands on area occupied in past by open forest; forest areas with Turkish oak; reduced accessibility; low tortoises standard density.

VHF (Very High Frequency) radio waves transmitters were used for radiolocation. 7 VHF transmitters ATS glue-on R1930 (produced by Advanced Telemetry Systems, Insanti, MN, SUA) were installed using an epoxidic adhesive on the carapace. The transmitter weighs 23 grams and has the following dimensions: 25 mm width, 57 mm length, 9 mm thickness. The flexible antennas allow the individual to move, without affecting its behaviour. The signal reception was performed using a

simple receptor model ATS FM 100 and a portable Yagi H-type antenna (Figure no. 1). The transmitters represented, in average, 1, 42% of the tortoise weight (min 1, 15% - max 2, 02%), which allowed the recording of a behaviour that is not influenced by weight. The transmitters were installed to 4 ♀ (the average carapace length = 214, 75 mm) and 3 ♂ (the average carapace length = 185, 6 mm) on 30.05.2006. A tortoise died during hibernation, being surprised by the frost outside the hibernation spot. The homing method has been used for tortoises positioning (exact positioning up to visual contact). After positioning, the following elements were recorded in a standard file: geographical position, GPS signal accuracy, positioning time, type of behaviour (inactivity, activity, feeding), environmental parameters (microclimatic measurements, weather status, atmospheric pressure, interactions with other species, anthropogenic activities etc). The positioning data were processed using the Biotas 1.3a and Animal Movement 2.0 software in order to obtain the territory and the land use pattern through different methods of analysis.

326 valid positions were obtained, which also included the sleep-hibernation period. The geographical position was determined on top of the carapace or in its close neighbourhood. Together with the positions we also determined the sleep-hibernation places (hibernaculum).

Movements between radiolocation positions of the tortoises monitored between June 2006 and October 2007

Frequency	Average	Minimum	Maximum	SD
664 F	54,78	8,76	235,28	53,74
694 M	46,94	6,87	137,43	35,36
715 M	36,89	3,23	99,90	26,69
733 M	40,609	3,93	158,29	39,42
754 F	47,72	2,28	179,22	44,34
793 F	30,42	5,28	111,37	26,18

The Home range has been evaluated using the minimum convex polygon method. The minimum convex polygon (mcp – minimum convex poligon or convex hull) is a classical non-statistical method for the home-range estimation, but that doesn't show and indications on the data distribution, being the smallest polygon that has internal angles wider than 180^0 and that includes within all the points in which the individual was located in. The territory of the monitored tortoises (MCP 100%) had shown average values between 0, 87 ha for males and 1, 39 ha for females. The maximum territory was of 2, 27 ha (female 664) and 1, 16 ha (male 754). It is possible to notice that the females show a wider variance of the territory, while the males show greater site fidelity (Figure no. 4).

In order to assess the temperature influence on the tortoises distribution and behaviour, 60 iButton temperature sensors (from Dallas Semiconductors) were installed in the area they occupy (Figure nr. 2, 3).

Figura no. 2 - iButton on habitat and on tortoise carapace

The tortoises we have studied had shown am active behaviour only between April and August. The males show a more active behaviour in the first post-hibernation weeks during the morning hours. The standing (motionless) tortoises have the lowest body temperature, mainly in post and pre-hibernation. The body temperature increases as it follows: slow motion, basking, motion, reproduction and feeding. This can be justified by the fact that these activities require high energetic resources, resources that the metabolism can release only for high body temperatures (Figure no. 5).

Figure no. 3 – Recording the data from iButton thermo logger from a tortoise in hibernaculum

Figure no. 4 - Minimum Convex Poligon for 6 tortoise monitored in 2006 and 2007

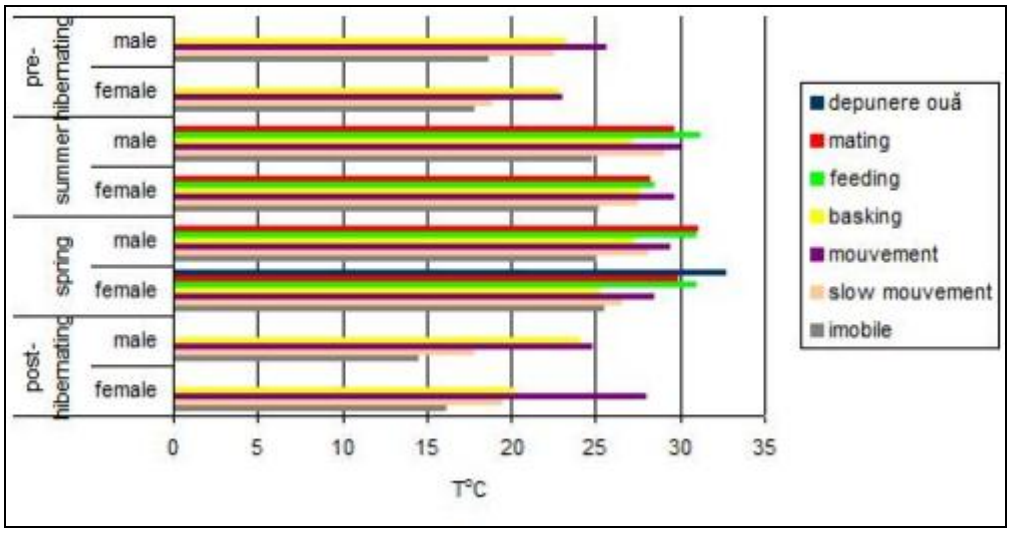

Figure no. 5– Type of behaviour correlated with the tortoises annual life cycle

Team involved: Laurentiu Rozylowicz, Iulian Niculae, Steluta Manolache, Gabriel Vânău, Radu Necşuliu

Improving the tortoise distribution pattern

Species distribution modelling is extremely important when they are declining and they need conservation measures to be applied immediately, based on some short-term research programmes. Our study has used the bioclimatic envelope models/patterns BIOCLIM and DOMAIN, implemented in the DIVA-GIS distribution modelling software. BIOCLIM pattern implementation has been performed using 255 reliable presence recordings (points where tortoises have been surely observed). The geographical position has been determined using GPS Garmin Gecko. The climatic data used cover the period between 1950 and 2000, Worldclim 1.4 data implemented in the DIVA-GIS being used. The method principles resides in extracting the pixels values in the reliable presence, absence or pseudo-absence points and identifying a binding function that describes the relationship between the predictors (habitats favourability function).

The topographical predictors used in the study have been derived from the digitisation of the 1:25000 topographic maps. The topographical position has been generated from the terrain digital model, recomposed at a 100 m resolution. Subsequently, all the predictors were agreed to a 100 m resolution. Land use has been taken over from the Corine Land Cover, from the European Environmental Agency database. It reflects the land use in 2000 (Figure no. 6).

The statistical analysis of the values has been performed with the linear generalisation model (GLM), implemented in Statistica 6.0. All the models were calibrated through binomial functions and logistic binding functions. Two series of models were calibrated: models that include only distal predictors and models that include only proximal predictors. We considered only the parameters that satisfy two criteria: 1) are significant for a 0.05 level of confidence, level that results from square chi and 2) to explain at least 1% of the deviance.

The comparison between the prediction and the field observations were performed with the Kappa statistics and Gini coefficient, a modified version of the AUC estimator (Area Under ROC Curve).

We have generated maps that consider three versions: proximal predictors, distal predictors and mixed. Thus, by using all the categories of predictors statistically valid, we have generated the potential habitats

favourability map for the Hermann's tortoise, using the RAMAS GIS and subsequently ARCGIS 9.1 (Figure no. 7).

Team involved: Laurentiu Rozylowicz, Steluta Manolache

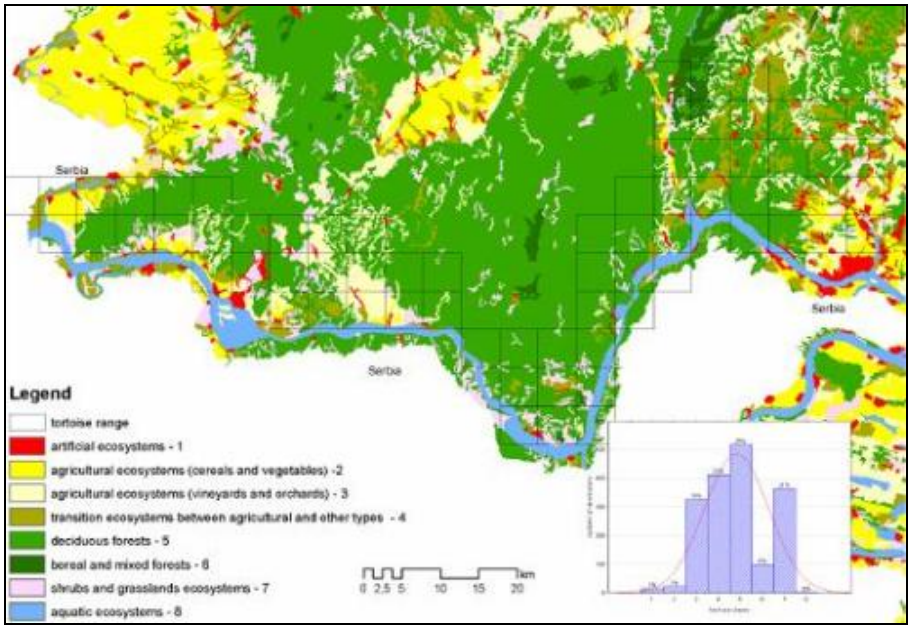

Figure no. 6 - Land use in tortoise range in 2002

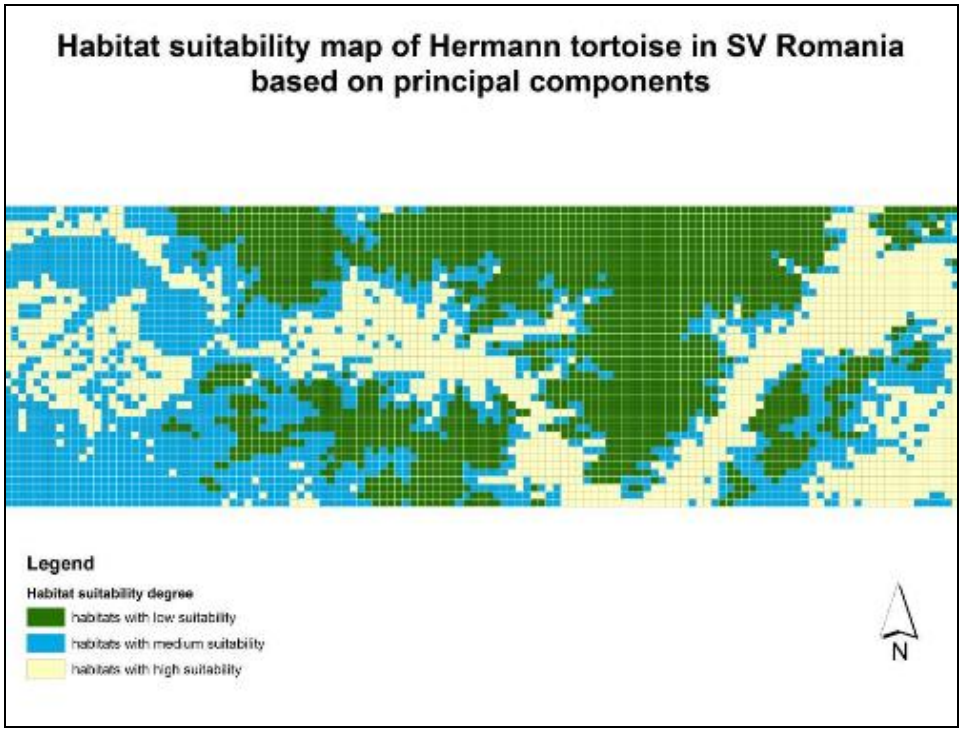

Figure no. 7 - Tortoise habitat suitability map

Proposing a protected areas system that to reduce the threats on the species

The analysis of habitats favourability allowed the establishment of a scheme for the future protected areas for an effective protection of the Hermann's tortoise. This action was proposed for funding and accomplished in the context when Romania had to legalise, by the middle of 2007, the Natura 2000 sites (SCI). Thus, in order to include the areas with a maximum favourability in the protected areas system, we have registered in the Natura 2000 sites proposals database, signing, on August 15th 2006, a cooperation protocol with the Iron Gates Natural Park Administration, and the environmental protection agencies from Caras-Severin and Mehedinti, the tortoise's habitats being located on their territories. Thus, together with the environmental protection agencies from Caras-Severin and Mehedinti we formulated the following:

- Natura 2000 – SCI type delimitation in South-West Romania on a surface of about 180000 ha (that includes 85% of the tortoises habitat);
- description of the habitats from the Natura 2000 site (the pasturage ones and the ecotone between forest and pasturage);
- description of the natural history of the tortoise, including the characteristics of the territories and the thermal requirements;
- describing the threats the tortoises deal with;
- proposals for threats reduction.

These proposals have been validated by the Scientific Council of the Iron Gates Natural Park from March 29th, 2007, being included in the documentation for the declaration of the Iron Gates Natural Park SCI, the Hermann's tortoise being declared as a species priority for protection in this park. For the time being, the site has been validated by the Ministry of Environment and submitted for approval to the European Commission (Figure no. 8).

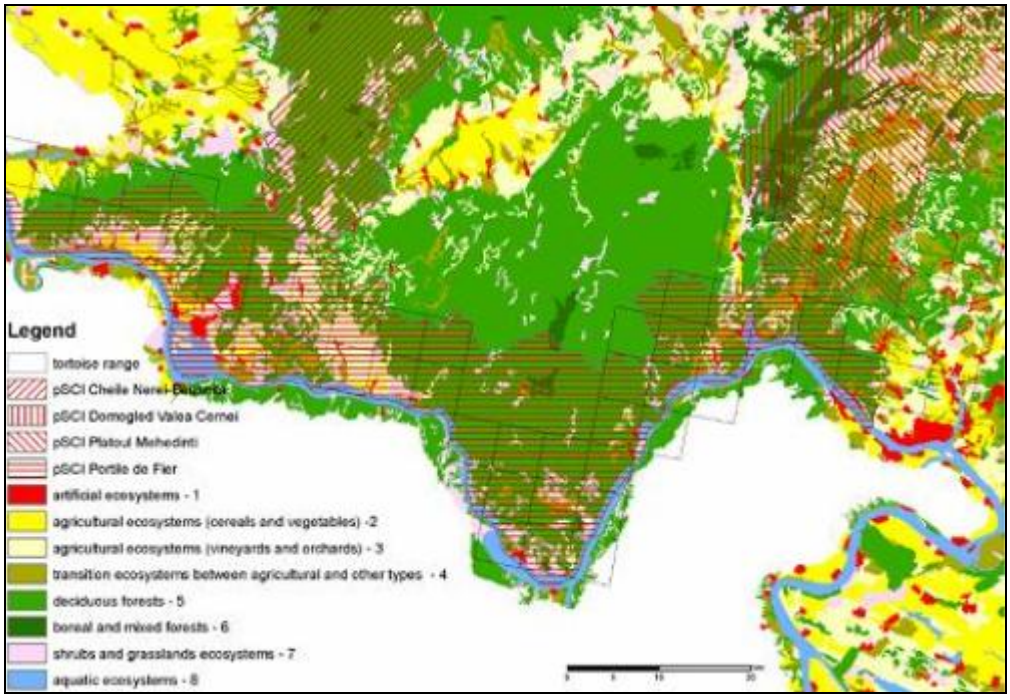

Figure no. 8 - Extension of SCI Portile de Fier correlated with tortoise range

Team involved: Laurentiu Rozylowicz, Marius Matache
Running an educational campaign with the farmers and tourists

A web page has been created within the project (1st Small Rufford Grant) entitled "Hermann's tortoise needs you" (www.portiledefier.ro/carapax). Between May 2006 and November 2007, the web page has been improved and updated. Thus, starting form the threats identified in the field, we have described the main dangers that the Hermann's tortoise is facing and the protection measures that are available to anyone. Information on the contact data of the institutions that people can contact when noticing a law violation in what regards the tortoise protection. We also created a page on the negative effects of the tortoise's collection, emphasising the fact that when a tortoise is taken out of its habitat, it has no chances of survival. Page efficiency was confirmed by the fact that we have been contacted in order to overtake 3 tortoises from Bucharest that were collected as pets. Finding the project website when searching on the web, the people were convinced to return them. After species determination, deparasitation and quarantine, the tortoises were returned to their natural habitat, being transported by us in the areas from where they were collected. For the time being, we are hosting another tortoise that will hibernate in artificial conditions and will be released in May 2008.

In order to raise awareness of tourists and farmers in what regards the protection requirements of the species, an A2 poster was designed and printed in 500 pieces entitled *Hermann's tortoise needs you* (Figure no. 9). The aim of the poster was to warn the target groups by the existence of this protected species and the ways they can obtain information about it. The poster has been transmitted to the town halls form the species area (35 town halls), schools (200 schools from the two counties) and local administration institutions from the two counties (EPAs, Environmental Guard, County Councils, Iron Gates Natural Park Administration). The rest of 250 posters were distributed individually mainly in the monitoring area (Eselnita, Orsova).

Figure no. 9 - A2 size poster: *Hermann's tortoise needs you*

Meeting the farmers from the Eselnita, Dubova, Ilovita, Svinita, Gura-Vaii, Divici-Pojejena localities. An important part of the project. The 6 meetings took place in November and December 2006 and covered the tortoise area surface.

The meetings took place after the meetings of the local councils, when most of the stakeholders were present in the town halls, 60 minutes being allocated for the discussions with our team. A PowerPoint presentation was created structured as it follows:

- Natural history of Hermann's tortoise in Romania;
- Hermann's tortoise protection: a necessity
- Threats on the tortoise
- Hermann's tortoise protection methods
- Ways to involve the local population in the tortoise protection.

On April 22nd, 2007, occasioned by the actions related to the Earth Day, a photo exhibition has been opened at the Eselnita Research Laboratory of the University of Bucharest, with photos realised by the project team members. Entitled "Hermann's tortoise – a landmark of South-Western Romania", the exhibition stayed open for 5 months, and was also visited by the pupils from the schools in the neighbourhood. In September 2007, the photos were donated to the school in Eselnita, to be used during the Biology and Ecology classes with the pupils.

During the project running, a good relationship with the mass media was carried out, for an optimal implementation of the raising awareness campaign and project dissemination. The means used to reach these targets included the press releases distributed to the press agencies and the national newspapers and also the direct contact with the journalists. But the main focus was related to the local mass media. 3 articles were published in the local media, one in national media and 2 news at national TVs (Figure no. 10).

Name of the article	Paper/TV station	Date	URL
Satellite-monitored tortoises in hibernation (original title, RO: *Ţestoasele monitorizate prin satelit, în hibernare*)	Editie Speciala de Oltenia	5.09.2006	http://www.editie.ro/mod.php?mod=stiri&idstire=35146
From newspaper classified adds to freedom (original title, RO: *Ţestoasele de la mica publicitate, în libertate*)	Editie Speciala de Oltenia	14.09.2007	http://www.editie.ro/mod.php?mod=stiri&idstire=50633
The release of eight tortoises, prisoners in Timisoara (original title, RO: *Eliberarea a opt broscuţe ţestoase, prizoniere în Timişoara*)	Realitatea TV	14.09.2007	http://www.realitatea.net/88132_Eliberarea-a-opt-broscute-testoase--prizoniere-in-Timisoara-.html
Teaching the tortoises how to survive (original title, RO: *Invata testoasele sa supravietuiasca*)	Libertatea	12.06.2007	http://www.libertatea.ro/index.php?section=articole&screen=stire&sid=161476

Team involved: Marius Matache, Steluta Manolache, Laurentiu Rozylowicz

Figure no. 10 - Media event in project

Other actions: Following control activities in Timis County, 6 adult and one juvenile tortoises were discovered in market by Environmental Guard, which had been illegally collected from the project area. The tortoises were transported to the Eselnita, where they were deparasited and species determination by Laurentiu Rozylowicz. Subsequently, the tortoises had been carried in the South Western part of Romania, and were released in 14 September 2007.

Team work: Laurenţiu Rozylowicz

Changes in the project

No major changes were carried out compared with the initial project.

Buget vs expenditure

The budget has been used according to the initial application, except the item equipment where the costs were higher than estimation. For covering the over cost why cut down the other items with a percent under 10%.

The money has been managed by the financial department of the University of Bucharest, the expenses being allowed only if they were found in the approved project proposal.

Approved budget		Final budget	
Expenditure	Amount (£)	Expenditure	Amount (£)
Transportation – train tickets for travelling in the project area, 265 £		Transportation – train tickets for travelling in the project area, 270 £	
Transportation – bus tickets for travelling in the project area, 200 £		Transportation – bus tickets for travelling in the project are, 105 £	
Transportation – fuel for car, 350 £		Transportation – fuel for car, 475 £	
Transportation – total	815	Transportation – total	850
per diem field trips for tortoise radio tracking – each person will work in field 1 week per month during April 2006 and Mai 2007 (4 persons * 3 £ * 45 days) per diem field trips for tortoise distribution pattern (4 persons * 3 £ * 40 days) per diem for raising awareness campaign		per diem field trips for tortoise radio tracking – each person will work in field 1 week per month during June 2006 and October 2007 (4 persons * 3 £ * 52 days) per diem field trips for tortoise distribution pattern (4 persons * 3 £ * 30 days) per diem for raising awareness campaign	
Per diem – total	1366	Per diem – total	1350
Colour Cartridge – for printing reports and meetings materials		Colour Cartridge – for printing reports and meetings materials	
General office supplies (paper, folders, envelopes, notes for field observations, ball point pens)		General office supplies (paper, folders, envelopes, notes for field observations, ball point pens)	
Battery		Battery	
Permanent markers for tortoises marking		Permanent markers for tortoises marking	
Consumable materials – total	685	Consumable materials – total	250
7 glue on transmitter from ATS (www.atstrack.com) – 650 £		7 glue on transmitter from ATS (www.atstrack.com) – 820 £	
ATS receiver FM 100 – 120 £		ATS receiver FM 100 – 100 £	
electronic thermometers for tortoise monitoring – 2 pieces – 150 £		electronic thermometers for tortoise monitoring – 2 pieces – 600 £	
GPS Garmin Gecko – 110 £		GPS Garmin Gecko – 121 £	
Equipment total	1030	Equipment total	1651
printing the poster A2 colour, in 500 exemplars		printing the poster A2 colour, in 500 exemplars	
plot the maps (A 0) for distribution at county EPA's and other - beneficiary		plot the maps (A 0) for distribution at county EPA's and other - beneficiary	
Publishing costs – total	600	Publishing costs	495
Phone costs, 100 £		Phone costs, 160 £	
E–mail, Internet cost, 150 £		E–mail, Internet cost ,41 £	
Communications total	300	Communications total	200
Total	4796	Total	4796