

European bison adaptation process in Spain – experience after transport from Poland (2010) and from the Netherland (2012)

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Abstract: The three years experiences of implementing the conservation program of European bison in Spain are presented. First import was from Poland in year 2010 (7 animals) and second from Lelystad in the Netherlands (17 animals). Those animals were transferred to 4 enclosures of different size and condition. The stories about all four enclosures are presented.

Key words: European bison, Spanish conservation program, EBCC

Introduction

In 2010 at San Cebrián de Mudá, 7 European bison were released into small 20 hectare enclosure. This releasing was playing the role of example for other breeders to encourage them to bison breeding and species conservation. This area we call San Cebrián de Mudá I and a lot information about this enclosure was presented in previous years (Moran 2011; 2012). This report describes only the population progress.

During year 2010 and 2011 European Bison Conservation Center of Spain worked hard to make ready three new places for E.bison breeding in the area of North of Spain. This places were Zapurrel (Asturias), San Cebrián II and Oviedo (Siero, also in Asturias). This idea was included into EBCC 2012 program work and encouraged by the experience at San Cebrián I, a complete success of adaptation worked out in 2010 with 7 European bison transported from Poland, now in their 4th offspring and being a 10 European bison herd, healthy and increasing every year. To meet the goal of finding new places, finding money and raise the willingness to breed this species took great effort – many presentations, project draw up, field visits and many discussions with national and regional governments about the legal framework of the project.

Planning for San Cebrián II and Zapurrel started in February 2011, and in October this year for Oviedo. Bison transport and release were accomplished in June 2012 in all places, i.e. by now there is more than one year experience accumulated. In June 2012, 17 European bison were transported from Netherlands and Belgium and released in these 3 enclosures. One year after, one of the centers is closed (the most important, Zapurrel) and the other 2 have remained, but not with all the animals. Out of 17 there are 6 left. It's

time to report what has happened to the whole European Bison Conservation world, in order to avoid in the future causes detected in this three initiatives.

Same time ago, these 3 different breeding centers promoted by EBCC Spain were not only new breeding centers, each of them had in different way meaning as an important example for different corporate and we believe they are key for three aspects of European bison conservation in Spain; small owners, touristic areas and the most important, big land owners.

Oviedo, with 2 ha enclosure, was an example for small owners. San Cebrián II with 200 ha, was a breeding center and touristic exhibition large enclosure, a new formula for San Cebrián improvement (Polish bison in 2010 were released in 20 ha enclosure). Zapurrel with initial 131 hectares, but included in a property of 2.000 ha, was the most important spot. This place was according to the EBCC Spain the best example for large land owners and game oriented reserves in Spain. This kind of large enclosure could become a model for E. bison hosts and breeders in the future. A compromise was to release E. bison into the large area in one year. In the release area bison shared territory with wild boar free population (come and go across the fence) and a population of around 50 mouflon.

All places were visited for evaluation before the release or during first release stages, by several experts: Mrs. Wanda Olech in March 2011, Joep Van de Vlakasser in June 2012 and Taras Sipko in July 2012. Also some expertise were provided by naturalist from Spain, Netherlands, Germany and Russia visited all places proposed by EBCC Spain. All were inspected and checked and found suitable according to: water supply, food resources and plants present in the area, enclosure suitability, other species present in surrounding area and inside the enclosure, social acceptance and poaching possibilities.

There are several factors, described and considered in this report:

Administrative and political factor. Always complex relation project-administration with sanitary authorities and also rural development and environment authorities.

Stress factor: Any situation we believe influences or affects E. bison state of health and adaptation.

Climate factor: How climate conditions can affect E. bison.

Social and human factor: How people (individual and groups) react to E. bison presence and project development, and how mistakes in the own organization can produce problems.

Nature factor: How plants and animals react to E. bison presence and interactions produced.

Background

European Bison origin. All E. bison were transported from Lelystad Bison Breeding Center in Netherlands. 6 were kept for one year in Han-sur-Lesse Nature Park at Belgium, rescued there by Joep Van der Vlakasser from surplus culling. In Lelystad every year are born between 8 to 12 new bison. There all

animals are kept in one group – adult females and only one main reproductive male so all offspring have the same father. All new bison must be sent out or be culled because of carrying capacity of the enclosure. Lelystad donates E. bison to conservation projects.

So we make decision to include this animals proposed by Joep Van der Vlakasser in our projects for 4 reasons:

Economic. Animals were donated, though we had to pay transport, papers and expenses for one year keeping of 6 bison in Han-sur-Lesse. All costs together were possible to cover by resources EBCC Spain had raised.

Genetic. At San Cebrián I there are animals of Lowland line from Poland, and in the area there is a zoo in Cabarceno with 11 Lowland animals, also Lelystad animals are of Lowland line.

Surplus. If those animals were not included in a conservation project they would have been eliminated, so this was a good idea to host them.

Age of animals. Although our experience in San Cebrián I showed that complete reproductive group was good for a new release, we believed a group of young animals will be more adaptable than old, specially as they were coming from the zoo.

European Bison were distributed according to their age and sex into 3 groups (Tabl. 1).

Table 1. Distribution of transported in 2012 animals (numbers in bold are for animals directly from Lelystad, not bold numbers for those kept in Han-Sur-Lesse, where were older animals)

Sex	Age [year]	Zapurrel	San Cebrián II	Oviedo
male	3	1		1
	2	2		1
	1		1	
female	3		1	
	2	1	1	1
	1	3	3	1
Total		7	6	4

There were 7 females one year old, so they were transported right after the weaning, but we not consider this as stress factor because we did not found that young age affected the situation.

Type of release

“Soft” and “hard” release definition. Soft release includes feed supply and concentrate, veterinary care and surveillance, barn, anti-parasite treatment,



Figure 1. The group of 7 wisents in Zapurrel in December 2012 in perfect shape

mineral supply, first release in small enclosure for controlled conditions and daily control. Hard release does not include this care.

In Oviedo it was decided to make soft completely controlled release, because of the enclosure size (only 2 ha), so it was impossible to leave four bison without help

In San Cebrián II we decided for semi-hard release. There was no food supply, but every three days surveillance, there was a barn, provided anti – parasite treatment, mineral supply and for some time release to 10 ha enclosure.

In Zapurrel due to high area and slope the only possibility was hard release with control once a week. Also we wanted to observe how bison behaved in a big area with unlimited food resources.

All these areas had electric fencing plus net wire fence 2 meter high.

The work before releasing

Preparations work included three areas in background:

Communication. A big media campaign was send to media for these releases. We had a very big answer from media and many people heard about those projects. This was one of targets also for European bison conservation.

Contract and works: Find all resources for fencing, facilities and transport. In the part of transport help from Joep Van der Vlakasser was invaluable. Many decisions were needed for transport, different group organization, loading and unloading in 3 different places. Facilities were build, for these facilities and fencing around 80.000 euro were raised.

Legality: 3 places were legalized as “bison farms”, so all E. bison were transported and legally considered as cattle.

Transport

On June 6th 2012, a team of four people took a car and went from Spain to Amsterdam to help in bison loading and transportation. Within the group were: one vet (myself), 1 wild animal expert, 1 stockbreeder and 1 professional cameraman. On June 7th all 17 bison were loaded. At Lelystad, the loading of 11 bison was done in completely perfect way. In three hours all eleven bison were ready to travel and come back safely from immobilization anesthesia.

In Han-Sur-Lesse was not that well. One animal was loaded in first place and this animal was already sick, weak and in bad body shape. This male did not get up after anesthesia. We decided to include it in the transport as we have loaded some others in same carriage, so to put the bison down meant unloading another 3 already loaded and previously immobilized animals. The medical care started with this bison with antibiotics, serum and inflammatory under prescription of Han-Sur-Lesse veterinarian.

When all animals were loaded (with some problems about brucellosis test, finally solved as negative) started a big problem which should be included in “*Administrative and political factor*”. The problem was raised with enclosure San Cebrián II. Regional Government announced in a newspaper that we are not allowed to release E. bison into large new enclosure, because the application for permission was not properly submitted and was done for the small enclosure (San Cebrián I). We had no permission to release them in the new area and we had to place them at the area occupied by existing herd – group of healthy animals from Poland, older and well structured, living there together for now 2 years!! During travel through France I was at the phone taking with almost all representatives of Regional Government, but they did not attend any reason. Today (end of July 2013) bison which survive, still remain there in the small enclosure because administration have stopped and delayed our applications for more than a year. Why this situation happened? The answer is simple – Mayor of San Cebrián village belongs to different party than Regional Government, so political orders were sent to obstruct this successful project that had a lot of media presence. This is Spain and this kind of things happen.

We also told the Mayor about the plan of releasing bison into large enclosure during night but when we were still on the road, the Mayor received

a threatening phone call from Regional Government. He was informed that if bison would be released into the large area, some social projects for the village worked out with Regional Government funds will be stopped “forever”. Mayor asked us to release animals to small enclosure.

Our situation was quite hard, with sick (and probably candidate to die in the transport) bison loaded in the lorry and all media following our transport, so we had to decide best.

In San Cebrián II there was no release. Animals were released in San Cebrián I, where a single electric line was placed to separate both groups and new bison were placed in the only place where this could be done; the feeding facilities. So new group integrated by young animals were placed in feeding area of a larger and older group and access to feeding station was stopped for this older group, what made a big problem.

In Oviedo the release was an odyssey. Lorry was too big to get into the enclosure, so we had to separate the trailer and tow it with a tractor. After 4 hours, all 4 E. bison were released there in perfect conditions.

In Zapurrel the release was easy if we do not count the weak sick bison. We released the 6 healthy bison and then took out the sick one, built a barn for him and supplied him with fresh water, provide rehabilitation and veterinary treatment. After 5 days this bison died. Diagnosis was *balanoposthitis* and general septicemia, first *balanoposthitis* described in Netherlands (as we cannot say in Spain).

Projects progress

Zapurrel: the group decreased from 6 E. bison to 0 and project was closed in one year. Within the 161 hectares enclosure the group of 6 E. bison started to forage on local plants and live on their own. They occupied during 4 months just part of this area, of size around 40 ha, more protected from wind, heat and with good water supply.

There were visits to check the situation of the herd from EBCC Spain on: June 9, 11, 12, 23, July 21, August 18, September 30, October 5,13,26, November 17, December 21,28, January (2013) 8,9, February 26, March 9,18, April 8,17,19,24, May 17,24, 27 when project closed. All together 25 day visits during one year, with a 360 km distance makes 9.000 km made for this project control.

From release in June 2012 to December 2012 the herd was in perfect shape. All bison eat all kind of plants (we can describe selective heavy foraging on *Hedera helix* and *Pteridium aquilinum*). They did a fantastic work on bush and shrub layer, composed of *Ulex europaeus*, *Cytisus scoparius* and *Erica arborea* and they cleaned these 40 ha area changing landscape from dense understory to open pasture. It was a success at that time. Even climatic conditions were very unusual; there was a very strange July with low temperatures (13 to 14 degrees) and heavy rain, and also a very unusual dry time from August to



Figure 2. Animals are facing narrow passage without problems

December and high temperatures. There was first freezing in December. We placed 2 watering spots in October and they were used by bison. In October the herd had split, males started to explore the whole area and females remained together in best places, more flat and best regarding the food resources.

We have to say that Zapurrel is very remote area, and very quiet. E. bison could spend days or weeks without seeing any people or simply hearing human activity, and although the release area is only 131 hectares, its terrain is very complicated to walk for people, so to stop, capture or simply inject any drug to E. bison, or even try to see them from a short distance for check or diagnosis was very complicated.

On December 28th we saw a sick female, one of the young. In this area they use to walk a track with rocks, ramps and shoulders, quite complicated even for goats. 4 days back there was first freeze and we believed this female could had a headlong and get hurt sliding off the track.

On January 7th this female was found dead. I worked out necropsy and found a big hit in heart (*myocarditis* with located edema and serious severe *pericarditis*), 2 ribs broken and some intestine worms (parasites, strongylos). Meat color and shape was all right so I diagnosed simply a headlong problem or any other trauma in chest. Female had liver steatosis as can be seen in pictures.



Figure 3. First alarm, white coat in December 28th.

On January 1st it started to rain heavily in the region. It were 3 months of extraordinary climate conditions, not remembered since 1968. From January to March rained and snowed same as other years for the full year. In the area many feral horses and cows died. On February 22 we were informed about bison dead and one missing for last 3 days. This time 2 years old male was dead. Three months earlier, during our visit on December 21, we saw that this male had a pus cord in the foreskin and was peeing frequently. We found him on a cliff bottom, he was hand standing, with horns nailed to the ground. Necropsy showed *balanoposthitis*, several bruises, broken neck and again liver steatosis and pericardium edema.

On March 4th we found the other missing young female. She was also at the bottom of a incline, but this was quite strange as it did not seem to fall there, it was more like she was thrown down after being transported there, from vegetation inspection. Her neck was also broken and her status did not allowed for necropsy as she was strongly decayed.

In the middle of March, there were three bison left. They were in very bad shape and their hair color was white. Because rain was washing all nutrients and winter was so hard, added to dangerous and hazardous slopes always wet, and lack of shelter except of the forest we started to be afraid of foraging deficiency so animals were provided with concentrate, mineral licks and



Figure 4. Our first dead bison (January 2013)

deworming treatment. However their interest in supplemental food and licks was rather low.

At this time we stopped to inform public about difficult situation in the enclosure, where bison were dying. During first 7 months from June to December E. bison were perfectly right, eating all kind of plants, also *Hedera helix* and *Pteridium aquilinum* which are regarded as toxic for cattle, but symptoms in the most extreme cases show up after two months of those plants eating, never after 7 months. But in January all animals started to die.

It's the same moment we started promoting from another NGO a new project right beside this area, with 54 Konik horses for breeding, meat production and tourism raising. We believed that such release of horses will change the social factor.

As this Konik project was held with 2 local stockbreeders we started to detect contrary opinion against this project. While E. bison were released into big landowner property the whole social situation was proper, but when stockbreeders of lower social scale started to participate, then other neighbors did not accept this activity and started to complain, explaining that stockbreeders involved in project were sequestering it for own profit.

Horses were released in December between 7th and 21st. In next 4 months, from January to April 2013, 36 of these horses died. 14 were killed by wolves,



Figure 5. Liver *steatosis* found in all dead bison

but all adult females before the death had miscarriage and many of horses died while eating. We had 14 miscarriages among 22 females. Because those animals were released in very bad moment of the year (very hard winter) we believed, that both *E. bison* and Konik horses were killed by bad weather and stress and additionally horses were exposed to continuous wolf attacks (we saw a 6 wolves' pack). Wolf attacks did not affected *E. bison* because the fence was designed to protect also against the wolf. Horses started to receive supplemental food in February, but though large amounts of food were provided everyday (hay, concentrate and straw) horses started to get weak and skinny, and died.

On April 8th the next bison was found – last young female. She was half eaten by vultures (they did not ate other dead bison) so necropsy was hard to make. It was noticeable, that she was very skinny with white hair, and her organs were shiny. Now I can say, that her bones were unusually brittle. At this moment I decided to close the project and take last two bison from this enclosure. I started to look for a place to send last two animals (male 4 years old and female 3 year old), where will be arranged small fenced place in a large enclosure with daily controlled regime and feed them heavily until they gain back body mass and body shape.

Both remaining *E. bison* were very skinny, their hair were white and brittle. They stayed within small area and it seems that walking up the slope was hard



Figure 6. *Balanoposthitis* in a male

for them. They were kept in a small enclosure and fed every day since April 10th. I gave them some antibiotic and also injected vitamins and minerals.

At same time we decided to send horses to different area, with the same vegetation and climatic conditions, 3 km in a straight line away from this area and property. There were 24 left in the herd. In first days 6 of them died, but afterwards were no more deaths and horses started to recuperate. They are still alive now and healthy, in spring one of the 3 remaining females had a colt and this summer all the group suffered 3 wolf attacks but no adult horse was dead (only one colt, in the first attack).

E. bison that remained there, were feed every day. I received a picture of them almost every day and made several visits. On May 17th I get the transport permission and I went to the enclosure to make last look on them before the transport. We decided to transport them on May 20th. But in this morning I found the female dead, still warm. She had foam in her mouth and neck, and I could see signs where her legs scratched the floor because of pain, and also she had scratched her body against big stones and earth as if she had a colic. Then I realized that there was a new possibility, something I did not think before because I could never suspect; “all these animals may be human poisoned”, both E. bison and horses. Social factor came to me as a revelation, thinking why horses died with food in their mouth, why females had



Figure 7. Additional feeding with minerals and deworming in March. Notice white coated bison

abortions and why these bison became everyday in worse condition while other bison were not doing so in other locations.

I called police but it did not come (Spanish crisis) and also they said there was no investigation possible as owner was the one to investigate. Necropsy showed again steatosis in liver, edema in heart and all body (muscle, organs) very bright. I took samples (liver, muscle, rumen wall and content, blood, fat) and send them to toxicology laboratory at University of Las Palmas. Also I decided to place security camera for 24 hour surveillance on last living male at Zapurrel.

After my suspicions were transmitted to the property (at this stage the land owner was terribly affected because of the project failure, believing it was a mistake to try to breed bison), I was told that at the property they used to set out poison in the area against predators and people were using compound herbicides for nuisance control.

Before sending samples I went to a drugstore and bought a compound herbicide tin, I asked for the most poisonous and effective. Then, I duplicated liver sample and injected one of the samples with this extremely dangerous liquid to be a control sample.

On June 10th I was told from the laboratory that none of samples I sent was contaminated, no poison in them. Then I answered that I had contaminated

one of the samples and this toxin was in the list offered by the laboratory. Since then, they did not answer anymore to emails or phone calls. I lost the samples I had, I only keep hair samples.

Male was transported to Oviedo enclosure on may 27th. At Siero he started to eat grass all day like mad and started recovering (during transportation bison was given serum and antibiotic), he seems to go well but on June 16th he died. I could see this animal just before death, and there were no symptoms, no temperature, no yellow mucous, no breathing difficulty. Again necropsy with steatosis affected liver and myocardium edema, but also in this case it could be seen edema in both kidney parenchyma. I have many samples in the deep freeze and I am trying to find a new laboratory. This was the end of last Zapurrel animal from 7 E. bison transported from Lelystad.

To complete this report, I contacted 3 people involved in poison detection. I got to conclusion there are some poisons very easy to detect (blood anticoagulants like stricnine, warfarine, dicumarine... insect & pest control like carbofuran or aldicarb) but there is another group of poison substances, herbicides, which detection is much harder. Also, in south and middle Spain herbicides are made of one component, as plant growing and powerful control is not necessary, but in north Spain herbs and bushes are growing much higher so many component herbicides are used, and these mixtures are hard to analyze by toxicologist. Poisson experts informed me that many animals are poisoned and even symptoms of poisoning are visible in the dead body if in the laboratory the poison is not detected.

So, at this moment it is impossible to say what was the reason of E. bison deaths: human poison, lack of adaptation, stress coming from bad food and mineral deficiency, climatic stress added to stress of living in a very slope area, natural poison from plants or all/some of this together. We are sure this animals did not die due to infectious disease because necropsy did not show that and serum test was done (brucellosis, tuberculosis and blue tongue were researched from blood test and all was negative) and we think that these animals were poisoned because animals in other places did not die, and because no horses died when they were taken out of the area.

San Cebrián: In this enclosure from 6 transported E. bison until this moment three remain alive. What happened in San Cebrián is simple to understand. Animals were released into small enclosure and simply were not accepted by the stable and already formed previous Polish herd.

During two weeks after the transport new animals were separated from E. bison in the enclosure by single electric line. All the time both groups spend the time watching each other and waiting for the time to join.

When finally wire was opened both groups shared the small 16 hectare area but never mixed. The first group did not allow new ones to come in, and they were systematically and violently separated from the group and food. Here we have a very negative *Stress factor*.



Figure 8. Young animal in Spring in Zapurrel

In six bison we have observed white and brittle hair, diarrhea (while the others were healthy) and they become weak and skinny, even eating, but many times they just stayed without eating, although there was plenty of food available.

It seemed that these bison have lost their will for life. There is an important situation to describe; in November 11th 2011 a female was born in the enclosure. This female, at age of 4 months, was able to hit with horns any of bison from the new group without reply! One of the females in new group was 3 years old. She also has grown completely healthy and fat.

As a result, 3 animals from new group died, first one in 2012 November 17th. In necropsy this female bison was horned (keeper saw the attack) and had 3 thorax ribs broken and many other injuries. Second in 2013 May 20th and third, male, on 2013 June 14th. All of them horned, attacked by other bison.

Within three remaining animals two oldest females have being accepted after a very long fight and now they both are in good shape. The other female is not accepted, all time with diarrhea and bad condition, keepers often separate her and give special care but we believe her future is probably near to the end. These three dead animals and fourth still affected were the youngest, released at the age of 1 year. The ones integrated were the older females of age 2 and 3 years.

We want to include in this report three important questions. One is the tremendous work done by San Cebrián people in taking care of these animals. Every time one of them was affected with diarrhea, people separated it provided sanitary care, gave food. This activity was very frequent during this year. They did a steady, daily and very hard work and also they were (and still are) very affected about this situation. In this case, *Social and human factor* at San Cebrián still is very positive, as animals are watched and cared daily after now 3 years after first release.

Second question, climatic situation were almost the same in Asturias (Zapurrel), one of the hardest winters known, with heavy snow and many rain, but this situation did not affect any of Polish bison and we believe Netherlands bison did not suffer because climate conditions was stressfull for them, so it was *Stress factor*. The question is for us, although situations were different, the bison reacted in the same way, become white, skinny and at Zapurrel died, but at San Cebrián were killed by the others, none died by itself.

Also, we have to say permission to transfer this bison from authorities, because *Administrative & political factor*, finally appeared in July 2013!!, but animals are not yet changed as now there are few left and new plans must be done.

Oviedo – Siero: In this enclosure the number of E. bison changed from 4 to 3 at the time of this report.

Oviedo is a kind of zoo. With 2 hectare area, flat, full of grass and small wooded areas, bison there have lived a nice life during this year, being fed in winter with hay and eating natural grass in spring and summer.

The only problems we had here were health problems, some diarrhea in change from winter pasture to summer, some parasites solved with ivermectine but nothing else except one dead female.

On 2013 January 7th the oldest female was found dead. The day before I was there and saw her and she was weak, had a hesitant but not shaky walk and was extremely skinny. She had temperature so antibiotic was injected and some serum. I have to say this female was treated against diarrhea in November 2012 and also with 3 days antibiotic therapy one week before situation became definitive. In the necropsy it was a clear case of nailed heart, infection (many fibrin) could be seen in peritoneum and in heart (pericardium and myocardium strongly affected). I could see fibrin path from abomasum to peritoneum but could not find the nail or wire.

After this problem, we tried to put some cattle magnets into the other bison but they just do not swallow them. In this case, I want to make a mention of Roberto Pérez, this E. bison keeper, who is in contact with me almost every day and who, since 2012 June 6th, is not relaxed if he spends one single day away from bison, not controlling their condition. This keeper also had very bad moments when we lost this female.

This dead female had in summer a problem of *Moraxella bovis* in her eye, but was cured. Same time another Polish female at San Cebrián had same problem. Infection was more advanced and she lost her eye.



Figure 9. Comparison in Oviedo between dark and healthy males, and the last one moved from Zapurrel. They are of the same age and origin.

Conclusions

In conclusion we have to say several factors affected these 3 new breeding center initiatives.

Administrative & political factor was definitive at San Cebrián. At Zapurrel and Siero/Oviedo administration cooperation was unsurpassable, as this area has different Regional Government.

Stress factor: We have to say this factor was very important at San Cebrián, we believe at Zapurrel also affected animals because of steep slopes (but certainly we do not understand why this stress did not appeared before) and maybe extreme climate conditions (but again this conditions did not affect other E. bison in other places). In Cantabrian Mountains falling from the slopes in winter is number one mortality factor for wild fauna.

Climate factor: Climate condition affected Zapurrel, in much higher rate than San Cebrián, because at San Cebrián there was always high quality food supply all the time. In Siero/Oviedo climate did not affect bison thanks to adequate food supply.

Social and human factor: In both ways, keepers interest and care is a very important factor for European bison adaptation and survival, and of course



Figure 10. Kidney inflammation, glomerulonephritis

people who are against can be very destructive by poisoning (poison in water, food or applied directly to animals), poaching or through damages to the fence.

Nature factor: Plants and other species. In this case we can say no interaction was made between bison and other plants but landscape management. There are 4 cases to describe. First female dead at San Cebrián was eaten by brown bear. This bear jumped the fence and trespassed electric wire to eat the female. We could see this tracks and took hair samples. We can say there is a positive interaction between bison (protein) and bear (scavenger). Bison bodies were eaten by scavengers. We did not try in any case send the dead animals to processing plant and many times we succeed.

Mouflons followed bison traces and areas. As bison opened bush areas and turned into the pasture, mouflons followed and started to accompany E. bison, so many times we could see both species together.

E. bison are extraordinary forest and bush cleaners. In all places their work with area management is remarkable and we hope that this species could be interesting for bush fire prevention in Spain and rural land abandonment.

Proces adaptacji żubra w Hiszpanii – doświadczenia po transportach z Polski (2010) i Holandii (2012)

Streszczenie: Prezentowane są doświadczenia trzech lat, tj. od początku realizacji programu ochrony żubra w Hiszpanii. Pierwszy import zwierząt był z Polski w 2010 roku (7 żubrów) a drugi z Lelystad w Holandii (17 żubrów). Zwierzęta były przywiezione do czterech zagród o różnej wielkości i warunkach. Opisane są warunki we wszystkich zagrodach. Z 17 przywiezionych w drugim transporcie zwierząt tylko 6 pozostało przy życiu. Przyczyny upadków są szeroko dyskutowane i kilka czynników bierze się pod uwagę. (1) *Administracyjno polityczny czynnik*. Relacje między realizatorami projektu a urzędnikami odpowiedzialnymi za wdrażanie przepisów sanitarnych, czy za rozwój regionalny czy środowisko są zawsze skomplikowane (2) *Czynnik stresu*. Każda odmienna sytuacja wpływa na stan zdrowia i możliwości adaptacji zwierzęcia. (3) *Czynnik klimatu*. Jak klimat wpływa na żubry. (4) *Socjalny i ludzki czynnik*. Jak ludzie (indywidualnie i w grupie) reagują na obecność żubra i rozwój projektu i w jaki sposób popełniane błędy mogą wpłynąć na powstawanie problemów. (5) *Czynnik przyrodniczy*. Jak rośliny i zwierzęta reagują na obecność żubra i jakie powstają między nimi interakcje.
