

DO EUROPEAN BISON AND DOMESTIC CATTLE CROSS SPONTANEOUSLY?

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In our efforts to realise nature areas which are as natural as they can possibly be, we inevitably end up discussing the pros and cons of introducing the European bison and thus in a broader context the role of large herbivores in natural ecosystems. One of the considerations in this matter is whether the European bison would cross with domestic cattle and de-domesticated cattle, such as Heck cattle in the nature reserve the Oostvaardersplassen, if European bison would be reintroduced there as well.

Some people support the full-scale replacement of Heck cattle in the Oostvaardersplassen with European bison in order to avoid crossbreeding. Placing the European bison in other nature areas would only be possible if the area was fenced off, so that bison bulls

would not be able to approach cows in heat on adjacent agricultural land. The validity of this argument is questioned by others who are convinced that crossbreeding is not an issue.

Looking into the matter more closely,

we found that the crossbreeding issue is based on the occurrence of European bison and domestic cattle hybrids (see photo) and the fact that, in the Bialowieza Forest in Poland, a European bison bull has often been seen among the domestic cattle. However, there is not a single report of spontaneous crossbreeding between these species in this area. Around 1900, approximately 10,000 cattle grazed in the Bialowieza Forest which at that time was also home to 7,000 European bison. Records on the size of these cattle herds go back to 1780, when 5,000 to 7,000 cattle lived in the area. In other words, domestic cattle and European bison have lived as neighbours for a very long time, without successful crosses ever having occurred.

Only seeing a bull of European bison among domestic cows therefore does not necessarily mean they crossbreed. In Lithuania during a period of 10-15 years a free ranging herd of European

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Popielno, 1984. Photo: Frans Vera.

bison quite frequently visited areas with domestic cattle without crossbreeding. There has been crossed, in fact there are a total of 165 known cases, but these can all be ascribed to the circumstances in which the animals were confined with each other in a cramped pen. In Poland the crossbreeding was done by the Polish Academy of Sciences. The scientists hoped to obtain a breed for the production of meat that could be able to withstand extreme weather conditions without shelter and making use of the forest instead of good pasture.

In the circumstances under which the crossbreeding took place, the animals did not have the choice of mating with one of their own species. In one case, a young bison bull was placed with a number of young domestic heifers while a young domestic bull was penned in with a group of young female bison. Initially, the bison bull showed no interest in the heifers, but he did react to the call of the bison cows which were confined in an adjacent pen with the young domestic bull. He wanted to go to the bison cows. He assaulted the heifers and pursued them. In the other pen, the bison cows attacked the young domestic bull so severely that the wardens even considered taking the bull out of the corral. The bison cows did not stop their assault until the wardens had driven the bull up against the cows. In another case, an adult domestic bull, which had already served domestic cows, was confined with bison cows. Despite his previous sexual experience, this mature bull showed no interest at all in the bison cows. After being taken from the corral he again mated successfully with domestic cows.

The number of successful matings of the bison bull with the domestic heifers was low, only 14% on average. Thirty per cent of these cases resulted in spontaneous abortion, so that only 5% of the successful matings resulted in the birth of a hybrid calf. All the calves had to be delivered with active human assistance, however. The cows did not experience any of the usual physical changes leading to a birth, such as relaxation of the vagina muscle. Thus, contractions did not lead to unaided parturition. Nor



Popielno 1984. Photo: Frans Vera.

was the placenta spontaneously expelled. In the wild, these complications would have been fatal for both cow and calf.

It seems that if the special circumstances mentioned happen in the wild, crossbreeding may take place between a bull of European bison and domestic cows, namely when no other animals of the different sex of the same species are present. In Lithuania a bull driven out by the herd in the pre-rut time mated with domestic cows. Some hybrids were born, although it is unknown how much and whether human help was necessary for the birth to be successfully. Taken all what is said before in consideration the chance that a hybrid could be born of a bison bull and a domestic cow in the wild is almost nil. And should a calf be born against all odds, there is a fifty per cent chance that it would be a bull calf which in the above study were all infertile. This means that a possible hybridisation in the wild would ultimately come to nothing. Only the female calves were fertile, but as stated above, they could not be born without human intervention.

The behaviour of the animals when they were penned up together – the way the bison cows behaved towards the domestic bull, and the way the mature bull ignored the bison cows – demonstrates the unlikelihood of a successful match between bison cows and domestic bulls in an area also populated by bison bulls. The behaviour of the bison

bull towards the domestic heifers, the low reproductive success rate, and the high prevalence of spontaneous abortion and birthing complications make a successful cross between European bison and domestic cows in fact impossible.

In summary, crosses between European bison which live in the wild and domesticated Heck cattle (or any other type of cattle that lives in a normal social structure in the wild) are a theoretical possibility only. In practice, the chances of such a cross are less than remote.

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LARGE HERBIVORES AND GOVERNMENT POLICY

Hans Kampf, National Reference Centre for Agriculture, Nature and Fisheries

In the Netherlands the issue of large herbivores in nature areas has generated considerable political interest. This was not necessarily inspired by a great enthusiasm for natural grazing. The discussion primarily concerns animal welfare and how the animals are managed. The State Secretary for Agriculture has now drawn up guidelines for the management of cattle, horses and sheep in nature areas (Leidraad grote grazers).

This policy is based largely on the Animal Health and Welfare Act. This Act provides the legal basis for management of large herbivores. The Act makes a very important distinction between animals which are kept, being livestock, and which are not kept. This is determined by the species, the type and size of the site, the degree of wildness and self-sufficiency of the animals. In large nature areas like the Oostvaardersplassen and the Veluwezoom (Imbos) the animals have become wild enough to be no longer considered livestock. That has led to the amendment of parts

of the Animal Health and Welfare Act for animals in the Imbos and the Oostvaardersplassen. For the time being large herbivores in other areas are regarded as kept animals in this legal context. An explanation of the consequences of this policy for the two categories is given below.

Requiring assistance

Every animal in a nature area must be given care. Care for kept animals can be compared to normal agricultural

practice: wherever possible the animals are identified and registered, there is supervision practically on a daily basis and an annual health check. In the extensive nature areas the manager visits the animals several times a week, if necessary accompanied by the permanent veterinarian. Once a year they decide whether the capacity of the site is being exceeded and whether intervention is necessary. The manager is a specialist in the management of large ungulates and he is supervised by a veterinary management committee attached to the nature area. Large herbivores which are not considered kept animals are managed on the principle that intervention is reserved only for cases of injury or illness which causes an animal severe or permanent suffering. Deviant behaviour can also be a reason to provide care.

Veterinary measures

On the basis of EU legislation Member States must take all possible measures to combat infectious animal diseases

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In European countries wild boar plays the same ecological role as the hyena in Africa.



A new-born foal abandoned by its mother. In a situation like this the manager would intervene to prevent unnecessary suffering.

such as foot and mouth. This applies both to kept and not kept animals.

The Oostvaardersplassen and Veluwezoom are situated at some distance from normal farms. Because animals are only moved in and out of these areas in exceptional circumstances and there are no other contacts between people, vehicles and so on from outside the area, the risk of infection is slight. Nevertheless both areas are the subject of a monitoring programme to detect any incident of animal disease at an early stage.

Dry Rendering Act

Carcasses from cattle and beef fall under the Dry Rendering Act. They are regarded as high-risk material and must therefore be destroyed. Carcasses should never pose a threat to their surroundings, public health or neighbouring cattle farms. Within an ecosystem carcass decay is a natural process that contributes to natural diversity. An exemption from the Dry Rendering Act allowing carcasses to remain in situ in

the Oostvaardersplassen and the Veluwezoom was rescinded because there was insufficient legal basis for the exemption under the Dry Rendering Act. But if the site is such that the manager is unable to remove the carcass, he or she must then take all necessary steps to avoid risk of contamination.

Relation to the Flora and Fauna Act

Article 2 of the new Flora and Fauna Act will be applicable to the large herbivores in the Oostvaardersplassen and the Imbos. This article concerns general duty of care for all animals living in the wild and their habitats. An exemption is required under the Act before animals can be released into the wild. Article 14 of the Act now ensures that large herbivores will only be released into those nature areas where they will really be able to survive without human intervention. If the site or species is not suitable, then the animals cannot be released into the wild and will consequently always be managed as kept animals in such a situation.

The Flora and Fauna Act has a different basis from the Animal Health and Welfare Act. The purpose of the Flora and Fauna Act is to protect species living in the wild. Chapter II of the Animal Health and Welfare Act relates to animal protection. Article 36 of this Act can be applied to animals, kept or wild, whatever the regime required by the Flora and Fauna Act.

Health status

Health status in large nature areas is determined every year on the basis of a veterinary examination. The methods of examination and reporting will be laid down in a protocol to be completed in the course of this year.

Control of livestock diseases

The control of livestock diseases is the responsibility of the Dutch Product Boards for Livestock Meat and Eggs which drafts a number of regulations. These regulations are also applicable



Heck cattle and red deer in the Oostvaardersplassen.

to large herbivores in nature areas. However for herbivores in the two large nature areas there is a different regime for the prevention and control of these diseases. In principle the rule is that there will be as little intervention as

possible in the natural process and that no large scale group treatment will be carried out because it is not possible to vaccinate animals preventively, or to herd them together. Should infections occur, then each case would have to be

assessed individually to find the most effective approach in order to prevent infection outside the site.

How to proceed

As we can see the necessary regulation is in place, but it is essential that managers and other people involved abide by them. A study needs to be made to see whether the rules need to be amended. With the help of provincial governments and site managers other sites will be identified where cattle and horses are regarded as not kept. In addition definitive policy will be developed for the implementation of European regulations on disease control in nature areas. Another important point is a possible regulation for the transport of non-registered animals under controlled conditions between large nature areas in the Netherlands and abroad.

The earlier mentioned guidelines (Leidraad grote grazers) will be implemented. The most important points for the manager are given below:

Research questions

The Ministry of Agriculture, Nature Management and Fisheries sets out the direction of scientific research into grazing. The major research themes that will be tackled in the coming years are:

- **Natural grazing systems**

What are the effects of and conditions for natural grazing in the Netherlands?

- **Animal health**

What reciprocal risks do livestock and grazing animals in nature areas pose with respect to outbreaks of diseases in humans and animals? How can unacceptable risks be prevented?

- **Carcasses**

What purpose do carcasses left lying in nature areas serve? What are the associated risks for the health of humans and animals?

- **De-domestication**

An inventory of the technical and ethical aspects of de-domesticating livestock animals for the purpose of restoring the natural grazing process which disappeared with their early ancestors. What can we learn of the behaviour of such free roaming animals (ethology)?

Hans Kampf, National Reference Centre for Agriculture, Nature and Fisheries.

Grazing and the Dutch national nature policy

Dutch national nature policy makes a distinction between several land management strategies. This table summarises national goals and the role and significance of grazing for each strategy.

	Management strategy		
	'Near-natural' and assisted-natural	Semi-natural	Multi-functional
General objective	Expand total area from 20,000 to 200,000 ha	Expand sensitive landscape types such as chalky grassland	Improve the quality of nature
Importance of grazing	Important in most types (approx. 125,000 ha)	Importance varies by type	large areas are grazed, including grassland meadow bird habitats (250.000 ha)
Goals of grazing	Large herbivores are part of the ecosystem. In supported units, grazing also promotes biodiversity	Grazing is primarily a means for maintaining and developing biodiversity	Grazing has both an economic and ecological purpose (i.e. biodiversity)
Possible herbivore species	Breeds bred, selected and managed for feralisation (Heck cattle, Konik), as well as wild populations of red deer, wild boar in areas over 5,000 ha	Extensive breeds (Scottish highland, Limousin, Norwegian fjord horse, various heathland sheep), and if necessary commercial livestock breeds. Also wild populations of roe deer, fallow deer, roe deer, wild boar in areas over 5,000 ha	Commercial livestock breeds
Grazing policy	Intervention only in the interests of naturalness or biodiversity	Intensity, period, etc. of grazing is tuned to the desired species mix of the target nature type	Target type partially determines the intensity, period, etc. of grazing
Veterinary controls	Only extensive control. No controls of wild populations	Regular veterinary control. No controls of wild populations	regular veterinary control

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Animal welfare in relation to the capacity of a nature area

Policy

- If there is danger that the capacity of a large nature will be exceeded, numbers should be reduced as a preventative measure;
- The primary responsibility for assessing whether there is a danger of exceeding capacity lies with the site manager;
- Capacity of the site and measures taken to prevent it being exceeded should be indicated by the manager in the management plan;
- At least once a year the manager must assess whether intervention is necessary;
- Only animals which are earmarked and registered under the I&R regulation may, if declared suitable for human consumption, be used for consumption if they are transported live to the slaughterhouse. Other animals will be removed for carcass disposal. The same rule applies to animals that are removed to other nature areas in the Netherlands or abroad.

Intervention in the event of suffering, disease, injury and irresolvable situations

Policy

- Large nature areas: Injured and diseased large herbivores in nature areas are not treated if they are expected to recover of their own accord. If the injuries are so serious or a disease so advanced that the animal is experiencing suffering considerably or incurably, or if the situation in which the animal finds itself is irresolvable and serious suffering is expected, the manager must take effective steps. In theory the animal would then be killed. If an animal is dying but is not suffering badly, the manager is allowed to allow the animal to die peacefully and not intervene.
- Other nature areas: In the other nature areas large herbivores should receive the necessary care and treatment when they are ill, injured or in need of any other help. If no effective treatment is possible and an animal is experiencing severe or permanent suffering it will be killed.

Supplementary feeding

Policy

- Large nature areas: In theory large herbivores should not be given supplementary feeding. There are two exceptions to this:
 - Supplementary feeding must be given if essential feeding stuffs such as minerals are absent or not available;
 - Supplementary feeding must be given if there is a risk of high mortality, a so-called population crash, due to exceptional circumstances, for instance flooding.
 This also means that individual animals are not given supplementary food.
- Other nature areas: In other nature areas it is assumed that animals are given the necessary care and sufficient food.

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Is natural grazing physically possible?

GRAZING: GET ON WITH IT!

Closing remarks by the editors of the special issue

The articles in this special issue underscore the growing popularity of grazing with nature managers, and also reveal that grazing can be an ecological success. That is not to say that grazing is the answer to all nature management problems. Too many large herbivores, or too few, the wrong species, the wrong place or poor timing; according to the authors, mistakes like these can have unexpected or negative effects. There is no such thing as a secret recipe for successful grazing. Interestingly, authors sometimes hold opposite opinions on various aspects of grazing. The many case studies of grazing in nature areas and scientific research serve as useful input in the often lively debate between experts. We the editors of this special issue, we would like to end by considering three main questions regarding grazing as a management instrument.

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Is natural grazing physically possible?

To ask this question is largely to answer it. Whether grazing is possible or not is a purely theoretical concern for the grazers themselves. Populations of cows and horses which have been introduced in large nature areas have shown to be almost as self-sufficient as their ancestors. Even authors who accentuate the unique role of *Cervus giganteus* and *Elephas antiquus* admit that the full range of foraging strategies is still represented by existing species. The bulldozer effect and the extremely high food requirement of ancient megafauna have of course disappeared.

While ancient fauna might to some extent be replaced, pristine nature is gone forever. The physical circumstances in and around large nature areas are and for the time being will remain incomparable with a truly natural situation. Nitrogen deposition, for example, has unnaturally boosted plant growth and thus the food supply. There are no large predators, so that it is easy for grazers to optimise their intake of the available food. These factors, which would be absent from a truly natural situation, facilitate population explosions. Finally, fences and other barriers keep herds from moving on in hard times. The conclusion is that natural grazing under current conditions is very

well possible, but demands incidental human intervention.

How does grazing affect biodiversity?

There are often high expectations of the effects of grazing on plants and animals, but these are rarely worded specifically as to which species should produce these results. This uncertainty is however inherent to a natural process. The collective efforts of scientists have done little to add to our knowledge about grazing effects, ecological and otherwise. It is remarkable

that our current knowledge hardly surpasses that of a quarter century ago. It is stated quite clearly in a separate article in this special issue. Despite positive exceptions, it is generally difficult to predict scientifically if grazing will have a positive effect on the whole range of species groups in an area. It is impossible to say whether grazing is better than mowing or felling. Perhaps, species which occur in extensive open, low-nutrient landscapes cannot survive by grazing alone.

Scientists have come to know more about specific aspects of grazing, that natural grazing creates more complete ecosystems, with niches for rare species of manure and carrion eaters. And that grazing leads to a new pattern of low vegetation, shrubs and trees, to which many fauna have difficulty adapting. Therefore, where grazing is used to restore or develop nature, site managers should pay special attention to the needs of fauna. If on the other hand, grazing is employed as a finishing management measure in a fairly balanced ecosystem, it will probably yield much better results. Finally, research has upset the general assumption that a stable livestock density gives the best results. There is growing evidence that in fact a certain healthy dose of fluctuation in large herbivore populations is crucial in the long run for the conservation of species diversity and a more developed landscape pattern. This also applies to large areas.



Highland cattle on a warm day enjoying a pool.



Is there room for any more Serengetis in the Netherlands?

How might natural grazing fit in modern society?

Grazing by farm animals and by wild or de-domesticated animals have become a common sight in Dutch nature areas. In striving to create a greater degree of naturalness in our country, it is logical to continue the process of de-domestication of primitive breeds of horses and cattle in a few large nature areas, and to allow natural regulation to take place. However, this is not without risk for humans and farm animals. On the other hand, farming also holds risks for nature areas as was all too clearly demonstrated during the recent outbreak of foot-and-mouth disease in parts of Europe (2001). Since most high-risk diseases are rare in the Netherlands, routine checks would probably be sufficient to prevent actual infections. Such checks would also be in the interests of the animals' welfare and improve the ethical case for de-domestication. It is important to keep in mind, however, that the desire to ban certain diseases has consequences for natural population dynamics, and may lead to other types of population regulation being required. These and other aspects mentioned earlier are limiting factors with respect to the ultimate naturalness of grazing.

Final conclusions

In view of the above, we can safely state that the popularity of grazing outstrips our current knowledge about this management instrument and about the natural process. Above all else, this raises the demand for more and better research. At the same time, however, we recognise that nature policy cannot be put on hold until the results of such research become known. Besides, it would be wrong to expect research to answer all our questions, for example the question of what actually constitutes natural grazing. Experiences in the field also provide valuable information, based on trial and error. The role of research should be to guide and monitor practice rather than to lead it.

Secondly, the Dutch government should collaborate with other countries and the European Commission to draw up clear-cut policy to ensure that this type of nature management continues to be possible in the future. Developments in agriculture also affect nature management and demand solutions: bureaucratic measures concerning the transport of unregistered animals, the registration of other animals in a manner which is acceptable to animals and man-

agers, but also the implementation of European regulations on animal health.

Grazing in nature areas should not only be the concern of nature lovers, but also of farmers and the public. Not out of animosity but out of genuine interest and good business sense. For 'natural' grazing to be adopted in more nature areas, partners from all walks of life need to be found, and this will require the sharing of information and open discussion.

Finally, it is important that we continue to be creative and ambitious in grazing practice. Field trials with new types of grazing are the best way of collecting information and ideas. Now is the time; now we have more public support than ever to let spontaneous natural processes take their course. Now we also have space; Dutch government policy calls for 200,000 hectares of new nature area to be realised in the years to come and about 27.000 ha of robust ecological corridors. May this be a challenge for other countries in Europe too; for nature and people and for social-economical developments as well.

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