

10 Years of breeding and releasing in the Netherlands. How are we doing? And where are we going to?

10 Jahre Züchtung und Aussetzung von Feldhamstern in den Niederlanden. Wo stehen wir und wohin wollen wir gehen?

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Zusammenfassung: Der Feldhamster (*Cricetus cricetus*) ist (stark) gefährdet und eine wichtige Zielart des Naturschutzes in den meisten europäischen Ländern. Obwohl in den letzten Jahrzehnten viel Geld und Energie in Europa für den Schutz und das Monitoring von Feldhamsterpopulationen geflossen ist, ist der Rückgang nicht gestoppt sondern eher beschleunigt. Es ist gerechtfertigt zu fragen, ob Feldhamsterschützer in ganz Europa die richtigen Maßnahmen ergreifen. Die meisten Projekte haben versucht oder versuchen, die Anzahl von Feldhamstern oder -bauen in einer spezifischen Region zu erhöhen. Aber es sind fast keine positiven Ergebnisse publiziert worden oder die Populationsentwicklung wurde nicht überwacht und die Effekte der Maßnahme bleiben unklar. Daher ist es möglich, dass Teile des Geldes, dass für Schutzmaßnahmen ausgegeben wird, für ineffektive Maßnahmen verschwendet wird. Obwohl es nicht einfach sein wird dies zu erreichen, sollten spezifische Schutzmaßnahmen immer mit einem Budget für Forschungsaktivitäten begleitet sein, um herauszufinden, warum einzelne Maßnahmen Wirkung zeigen oder warum nicht. Am wichtigsten ist es die Ergebnisse zu publizieren, sowohl Erfolge, als auch Misserfolge.

Schlagworte: Feldhamster, Schutzmaßnahmen, Effektivität von Schutzmaßnahmen

Abstract: The hamster is (highly) threatened and a major nature conservation goal in most European countries. Although much money and energy was invested across Europe for the conservation and monitoring of hamster populations in the last decades, the decline has not stopped or is even accelerated. It is justified to question whether hamster conservationists across Europe take the right measures. Most hamster conservation projects in Europe have tried or try to increase the number of hamsters or hamster burrows in a specific area. However, almost no positive results are published or the population is not monitored and the effects of conservation measures remain unclear. Therefore it is possible that part of the conservation money is wasted on ineffective measures. Although it is not easy to achieve, conservation measures should always be accompanied with a budget for research activities to find out why specific conservation measures work or do not work. Most important, one should publish the experiences, successes and failures.

Key words: Common hamster, conservation measures, effectiveness of conservation measures

Introduction

The Common hamster (*Cricetus cricetus*) is a small medium-sized rodent, with a short lifespan (maximum of 2-3 years) (KUITERS et al. 2007) and, as compensation, a high reproductive rate with up to 3 litters per year (NECHAY 2000, FRANCESCHINI-ZINK & MILLESI 2008, HARPENSLAGER 2009). The species inhabits cultivated fields and farmland across Europe and occupies an underground burrow. Most important, the species is a very attractive prey for all kind of mammalian and bird predators (KAYSER et al. 2003a, LA HAYE et al. 2008).

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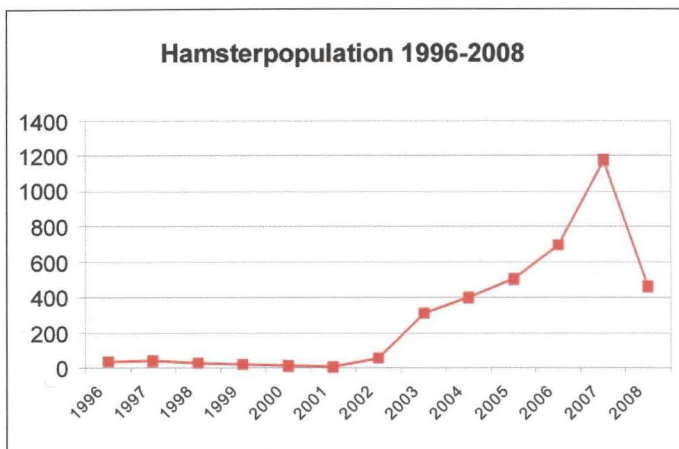


Fig. 1 The hamster population in the Netherlands strongly increased since the start of the reintroduction project in 2002. However, this increase was only in the short term and the population showed a strong decline in 2008.

The last fifteen years the population of the hamster collapsed in most parts of Europe, with a more than 95% population decline in Belgium (MERCCELIS 2003), the Netherlands (KREKELS 1999), the federal state of Northrhine-Westphalia Germany (PAULY 2007) and France (EIDENSCHENCK pers. comm.), but also some strong population reductions in Eastern Europe (BIHARI 2008). Nowadays, the species is (highly) threatened and a major nature conservation goal in most European countries. Although much money and energy was invested across Europe for the conservation and monitoring of hamster populations in the least decades, the decline has not stopped or is even accelerated (WEINHOLD 2008). The only exception seems to be the populations in Belgium and the Netherlands, where conservation projects have resulted in an increase of the number of burrows (LA HAYE et al. 2006, VERBIST 2008, MÜSKENS et al. 2008). However, the increase of the number of burrows was only achieved in the short term and the populations are still very small and highly vulnerable for stochastic events or other threats (figure 1).

It is justified to question whether hamster conservationists across Europe take the right measures. Over the last years much information was collected on the ecology of the Common hamster and presented on International meetings of the Hamster Workgroup, but there's still an urgent need for evidence-based conservation measures. This article will present an overview of conservation measures propagated so far, their potential effects and the results in practice. We used the overview of conservation measures in the Draft European Action plan (WEINHOLD 2008) as the most important source of information on current applied conservation measures. It is therefore possible that we overlooked projects which have implemented other conservation measures. At the end of this article we give some conclusions on the effectiveness of current conservation measures, and provide advices for future conservation and research topics.

Applied conservation measures

Among the scientists working on the conservation of the hamster, it is widely accepted that the major changes in agricultural practices throughout Europe, as a result of the EU agricultural policy, have had a tremendous negative effect on hamster populations (NECHAY 2000, WEINHOLD 2008). However, it is very difficult to assess the direct effects of the EU agriculture policy on hamster-friendly practices or detrimental farming practices, because the effects can vary between countries depending on geographic, cultural or even sociological factors (Wildlife and Sustainable farming initiative 2008). To make this topic even more complex, climate change may also have an effect on population persistence as suggested by NEUMANN (2008), who based his suggestions on the presence/absence of fossil records in cooler and moderate climate periods thousands of years ago.

Although it is difficult to assess why the EU agricultural policy has such a tremendous effect, it is possible to describe the mechanisms leading to a decline of the hamster population. On the European or country scale the most important reasons for decline are: 1) changes in land use, 2) intensification of agricultural practices and 3) fragmentation of populations. On a smaller local or field scale the driving factors behind the decline might be: a) improved harvesting techniques, b) use of pesticides, c) hunting and d) traffic victims. To counteract the negative effects of the changes in the agricultural practices and the agricultural landscape a variety of conservation measures are applied.

Conservation measure: ploughing restrictions

In many conservation projects ploughing or ploughing depth is restricted for several reasons. Deep ploughing (more than 25 cm deep) may damage the burrows or even kill the hamster. Ploughing of the field, in most cases cereal stubbles, directly after the harvest also reduces the possibility for hamsters to collect food or to collect spoiled cereals grains. For these reasons ploughing of cereal stubbles is postponed till late or half October. The effect of postponed or late ploughing should theoretically result in an increased survival of hamsters.

However, in modern conventional farming almost no grains are spoiled, which means that, with or without ploughing, there's no food to collect. Most hamsters also have a burrow at a depth of at least 50 cm, which suggests that ploughing till a depth of ca. 40 cm is not harmful: this depth is quite normal in conventional farming. We haven't found a single study reporting the positive effects of postponed or late ploughing. However, in the Netherlands we have seen detrimental effects of postponed or late ploughing. We saw that after harvesting of the cereals hamsters were faced with a lack of cover, which led, within 3 weeks, to predation of ca. 40% of the hamsters. Another 40% moved to surrounding fields or further away. But surrounding cereal fields only provide safety for a short period, because these fields were also harvested within weeks. And moving to other fields is not without risks: running around increases the probability of getting predated (MÜSKENS et al. 2008). We observed that in the end ca. 20% of the hamsters stayed on a field and the best way to protect these hamsters is ploughing. When the field is ploughed, the hamster has no reason anymore to be active above the ground. Most hamsters will close their burrow and stay underground until the next spring. Immediate ploughing also enables a farmer to sow the next crop, which can give renewed cover.

Conservation measure: no liquid manure and/or herbicides

The supposed detrimental effects of using liquid manure and/or herbicides is the direct or indirect killing of hamsters. It is suggested that using liquid manure may lead to flooding of burrows (BACKBIER et al. 1998) and herbicides may lead to (indirect) poisoning of hamsters or may affect life expectancy and/or reproductivity (KAYSER & STUBBE 2003). Using liquid manure, however, doesn't lead to flooding of burrows in the Netherlands and no deaths were reported as a direct result of liquid manure.

In Saxony-Anhalt, hamsters were tested for the presence of persistent organochlorides (KAYSER et al. 2001) and heavy metals (KAYSER et al. 2003b), but the concentrations of most substances were low and seemed not life-threatening for hamsters. The dissections of dead hamsters in the Netherlands confirmed the expectation that most hamsters are in good condition, with healthy reproductive organs. It seems that organochlorides and heavy metals have no effect on hamsters, but it cannot be excluded that there are indirect effects on survival, because affected hamsters may have a different behaviour leading to an increased rate of mortality.

It is obvious that direct evidence for detrimental effects of using liquid manure and herbicides on hamsters is lacking and, again, no studies were found reporting positive effects of this conservation measure. In the Netherlands the prohibition of using liquid manure and herbicides even led to some unexpected negative results on the hamster-friendly managed fields. The growth of the cereals was very slow in spring and the crop was very open during the season. In both cases this resulted in a high mortality of the hamsters (because of the lack of cover) and almost no new hamsters migrated into these fields.

The ban on herbicides was, however, favourable for some root-weeds: Broad-leaved Dock (*Rumex obtusifolius*), Creeping Thistle (*Cirsium arvense*) and Couch-grass (*Elytrigia repens*) became dominant within 2-3 years. Hamsters don't benefit from these weeds and agricultural management becomes problematic on fields where these plant species increase in abundance or dominate the crops. Without using herbicides it is almost impossible for a farmer to keep the fields in good agricultural condition.

In the Netherlands it is no longer forbidden to use liquid manure on hamster-friendly managed fields, and using herbicides is strongly advised whenever necessary.

Conservation measure: smaller fields and applying margins

The idea behind smaller fields and applying margins is to create more variation within a landscape. Hamsters might profit from these measures, because it should increase the amount of food, increase the number of opportunities to seek for shelter and increase the 'quality of the habitat'. However, there is no common definition of small and large fields used in literature. In the Netherlands a field of 20 hectares is really large, but in some parts of Germany or Hungary the smallest fields may start around 50 hectares. The definition of large and small has to be described and defined, including the landscape scale or landscape matrix. Only with that information, it is possible to have an idea if more variation, as a result of smaller fields, may lead to the supposed positive effects on hamsters. So far, there is no evidence that hamsters benefit from smaller fields or more variation of the landscape matrix. And from a practical point of view it is more time-consuming and more expensive to manage smaller fields with different crops than large fields with only one crop.

The effects of field margins or unharvested stripes are mixed, with no clear results in a German project which applied small stripes (<5 meters) (MARTENS 2003), but in the Netherlands good results were reported in the case of broad unharvested stripes of cereals (at least 20 m wide and 100 m long) and a source population of hamsters nearby (Van der Beek *et al.*, 2006). The success of stripes without any other conservation measures seems questionable, because most hamsters that inhabited the stripes were juveniles looking for a good location to hibernate. The juveniles were probably born late in the year (at least after the conventional period of harvesting) on cereal and alfalfa-fields with a hamster-friendly management.

The above examples show that several hamster conservation measures which are applied throughout Europe do not work or even have detrimental effects. It is urgently needed to translate the ecological needs of the hamster into adequate measures and to test whether these measures are effective or not.

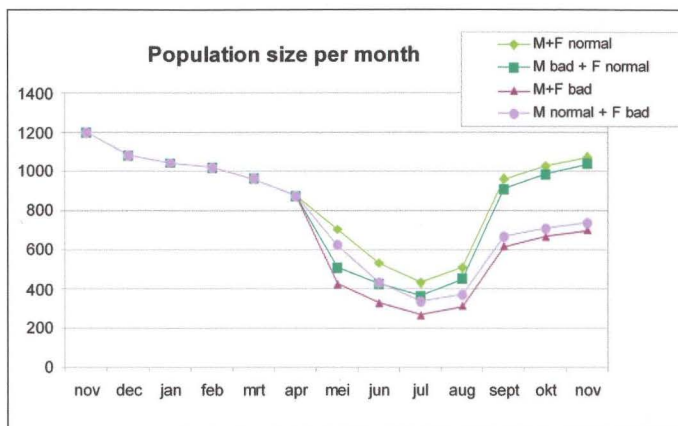
Population survival

A model study by ULBRICH & KAYSER (2004) provided critical factors for hamster survival. Their results show that on a landscape (European or country) level the presence of suitable habitat, habitat connectivity and late harvesting have positive effects on the long-term survival and sustainability of hamster populations. On a local level it is the survival of females and juveniles, the reduction of mortality, the presence of habitat and late harvesting which have positive effects on the sustainability of a hamster population.

The results of the reintroduction and monitoring project in the Netherlands confirms most of their findings (MÜSKENS *et al.* 2005, LA HAYE 2008). Female survival is a key factor behind hamster population growth, while the survival of males has only a minor effect on population growth and persistence (LA HAYE *et al.* 2008). A small increase in female mortality has a large effect on the growth of the population (figure 2). A higher female survival results in more litters per season, with more juveniles.

The effect of the decline in suitable habitat has not been tested in the Netherlands, but it is clear that the area with suitable crops (cereals and alfalfa) has declined significantly and that suitable crops (cereals) have been replaced by maize in comparison with some decades ago.

Fig. 2 Population size changes during the year, with 'normal' and 'bad' survival of males and females. The survival of males has almost no effect on population size, while the survival of females has a very strong effect.



Cereals nowadays grow on only 25% of the fields in the best 'hamster-areas' of the Netherlands, while historically it was above 70%. The Dutch research has also found indications that late or postponed harvesting of cereals, as predicted by ULBRICH & KAYSER (2004), is beneficial for a hamster population, although not harvesting has the best results.

Another aspect is the connectivity between populations. In the Netherlands several small and isolated populations have been established through reintroduction. Although the distance between most of the populations is not very large, sometimes only some kilometers, exchange of individuals does not occur. The agricultural landscape between these populations is too hostile for hamsters (VAN WIJK 2009). Only with enough suitable habitat corridors for hamsters it is possible to prevent inbreeding and to recolonise empty habitat patches. Making such corridors on a regional scale is already very difficult in the Netherlands, but on a European level such migration corridors are completely impossible. Nowadays there are too many roads and urban areas, which will make a natural migration of hamsters impossible on the European level. In Western Europe reintroductions and translocations seems to be the only realistic option to establish new populations, to restock empty areas or to increase the genetic variation in isolated and inbred populations (LA HAYE et al. submitted). In Eastern Europe it is probably still possible to connect isolated populations and to establish populations in areas where the hamster has gone extinct.

Preliminary advices on conservation measures

Most hamster conservation projects in Europe tried or try to increase the number of hamsters or hamster burrows in a specific area. However, it appears to be rather difficult to develop measures which have the desired effects. Almost no positive results are published or the population is not monitored and the effects of conservation measures remain unclear. Therefore it is possible that part of the conservation money is wasted on ineffective measures. Although it is not easy to achieve, conservation measures should always be accompanied with a budget for research activities to find out why specific conservation measures work or do not work.

The research and monitoring results of the Dutch hamster project have had and still have a large impact on the conservation measures which are taken. The hamster-friendly management has developed from rather detailed and difficult at the start of the project, into simple and highly efficient measures nowadays. Farmers with hamster-friendly management have only a few restrictions on their agricultural land and farming is almost conventional. The most important restrictions are the moment of harvest and how much of the crops can be harvested in a specific year. The result is a less intensive agricultural management from which the hamster greatly benefits and, with them, a variety of other threatened farmland species, mainly birds.

Differences between Eastern and Western Europe

Although the afore mentioned conservation measures have proven to be effective in the Netherlands and resulted in an increase of the hamster population, this does not mean that the Dutch conservation measures will work in other European countries as well. There are large differences between West and East European countries, and almost nothing is known about the ecological amplitude of the species in different countries or regions within Europe. In the Netherlands for instance, it is unimaginable that hamsters inhabit urban areas, whereas in Vienna (Austria) and Simferopol (Ukraine) hamsters are living in habitats such as cemeteries, parks and residential areas (FRANCESCHINI & MILLESI 2008, SUROV & TOVPINETZ 2008).

The fact that hamsters are still relative widespread in Eastern Europe suggests that the habitat is of a higher quality and/or that the ecological amplitude of the species is broader than in Western Europe and that the protection of hamsters might be much easier in Eastern than in Western Europe. Perhaps it is in Eastern Europe enough to: 1) stimulate the growth of hamster-friendly crops (cereals and alfalfa, 2) introduce measures such as late harvesting and survival stripes and 3) preserve hamster habitat through cross-compliance. In Western Europe conservation of the hamsters is far more difficult and strong conservation measures are needed (LA HAYE 2008). The agricultural landscape has lost many plant and animal species and it will be challenging to reverse the dramatic changes of the last decades. The most effective strategy seems to be to concentrate the conservation measures in special core areas, because the measures are expensive and implementation of the measures is only possible in a step-by-step approach. Introducing conservation measures country-wide or within the natural range of the hamsters is far to complicated and political impracticable. In Western Europe it is strongly recommended to: 1) concentrate measures in core areas, 2) develop management agreements which are attractive for farmers, 3) establish agricultural reserves or areas where farmland species are the main profit and not the agricultural products. Preserving agricultural habitat through cross-compliance will not lead to an increase of threatened farmland species in Western Europe, because much more efforts are needed to increase the ecological quality of the current agricultural landscape.

Conclusions and recommendations

In the last 10 years, the knowledge of hamster ecology has increased significantly, but this has not led to an increase of the hamster populations in most countries. The lack of (effective) conservation measures is, probably, the most important reason. Most Governments spent only a restricted amount of money on hamster conservation, but mostly much more money is needed for effective and efficient conservation measure and their evaluation. A multi-species approach, including not only the common hamster, but also other farmland species, will broaden public support for the conservation of hamsters and their habitat. However, implementing and developing efficient and effective conservation measures is not easy. Cooperation and support of farmers and farming organisations is essential for a conservation project to become successful. Only if one is able to implement conservation measures which are beneficial for hamsters and acceptable for farmers, a project can become successful. In practice this means sufficient compensation and subsidies for hamster-friendly management, a national or regional approach (because geographic and cultural differences are important), and some funding to evaluate and monitor the conservation measures. Most important, one should publish the experiences, successes and failures. And a last recommendation: dare to choose. It is sometimes a better strategy to take no measures, than taking measures which are ineffective. Only if one can show positive results, reflected by an increase of the hamster population, it is possible to ensure support for the conservation of hamsters in the next decades.

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