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Towards the European eradication of the North American ruddy duck

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Abstract The North American ruddy duck is an invasive alien species in Europe, which threatens the native white-headed duck through hybridisation. A substantial population established in the UK following escapes and releases beginning in the 1950s. The species then spread widely within Europe, with records across much of the continent, and viable populations established in Belgium, the Netherlands, France and Spain. An international plan to eradicate the species from Europe has been adopted, but the approaches and intensity of control have varied widely between countries. We report on progress towards eradication across the continent. Numbers in 2013 were less than 7 % of the 2000 population, although coordinated action is still required to achieve eradication. The European Union is considering a new legislative

instrument on Invasive Alien Species, which is likely to place responsibilities on member states to control named species. Coordinated control across those member states with remaining ruddy duck populations is likely to be an early test of any new responsibilities, with the potential to achieve the first continental scale eradication of an invasive alien species.

Keywords Invasive alien species · Eradication · Ruddy duck · Wildlife management

Invasive alien species (IAS) pose one of the greatest threats to global biodiversity (Butchart et al. 2010). The most effective way to manage the impacts caused

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by IAS is recognised to be the prevention of new, unwanted introductions, but once this has failed, eradication is the best alternative (Genovesi 2007). This involves the complete and permanent removal of all wild populations of an IAS from a defined area, by means of a time-limited campaign (Bomford and O'Brien 1995). There is an increasing story of success for IAS eradications on islands, predominantly involving mammals (Genovesi 2005; Martins et al. 2006; Gregg et al. 2007; Veitch et al. 2011), although it has been suggested that we are still not aiming high enough (Simberloff 2002). Vertebrate eradications at a national level are few and none has been attempted at a continental scale.

Here we report on progress towards the eradication of the North American ruddy duck (*Oxyura jamaicensis*) from Europe. This species was introduced into wildfowl collections in the UK in the 1940s. Following escapes and releases in the 1950s and early 1960s, an introduced population became established (Smith et al. 2005). Individuals spread beyond the UK and the first ruddy duck was recorded in Spain in the early 1980s. There, hybridisation between ruddy ducks and the endangered white-headed duck (*Oxyura leucocephala*) was first recorded in 1991 and, as a result, the Spanish Government began a programme of control to prevent hybridisation. Ruddy duck numbers continued to grow in the UK, numbering almost 6,000 by the turn of the millennium (Kershaw and Hughes 2002), and viable populations also became established in France, Belgium and the Netherlands (Muñoz-Fuentes et al. 2006). In recognition of the need for international effort to combat the threat to the white-headed duck, an action plan for eradication was developed (Hughes 1999). Control in Spain successfully prevented any significant introgression of ruddy duck genes into the white-headed duck population (Muñoz-Fuentes et al. 2012). Following regional trials, a national control programme began in the UK (Smith et al. 2005; Henderson 2010), and control activities were also initiated in other European countries. The action plan for the conservation of the white-headed duck (Hughes et al. 2006) recognises the ruddy duck as the greatest long-term threat to the species and the international eradication action plan was revised in 2010, with the aim to eradicate ruddy ducks in the wild in the Western Palearctic (Cranswick and Hall 2010).

The success of the eradication plan depends on coordinated action across states. Spain began control

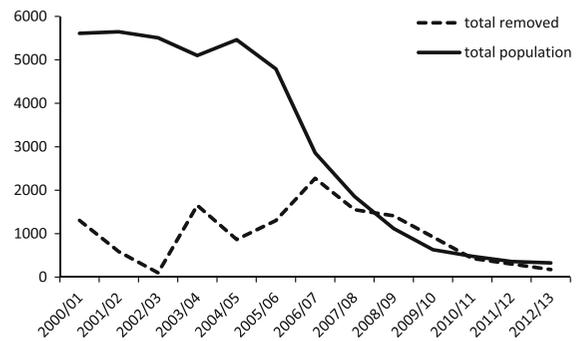


Fig. 1 The trend in reported total ruddy duck population and the total removed per year in Europe, 2000–2013

of ruddy ducks in 1984 and hybrids have been removed since they first appeared in 1991. This control has continued, with all identified birds, including 68 hybrids, being shot; two hybrids were also removed in Portugal. Few hybrids have been seen since 2004 although in Spain small numbers of ruddy ducks continue to appear (Cranswick and Hall 2010, Muñoz-Fuentes et al. 2012). The UK was the source of all records of this species elsewhere in Europe, and until recently held the highest numbers. Control trials to refine methods, record costs and assess public acceptability began in 1993 (Smith et al. 2005). A large scale control programme, primarily based on shooting, was initiated in 2005 with funding from EU-Life. This led to a population reduction of around 98 % by 2013, and nationally funded control is continuing. In France, control operations began in 1997 initially focussing on the removal of individuals during the breeding season. However, numbers continued to increase until 2010. To augment the control effort, a national eradication plan was announced giving responsibility to local authorities to undertake control. In Belgium coordinated active control started in 2011/12 with a small operational team shooting birds at the most frequently used sites. In the Netherlands, the national government is in the process of coordinating actions in the provinces which have responsibility for wildlife management, but no control has been carried out to date. Elsewhere, including Switzerland, Iceland, Denmark, Portugal, Slovakia, and Sweden, countries have controlled the small number of birds present or established plans to do so should they appear. The overall ruddy duck population in Europe has been reduced to less than 7 % of that present in 2000 (Fig. 1). However, there are issues

with the consistency of data collection and reporting, with member states adopting different methods, timings and frequencies of counts (Cranswick and Hall 2010) which adds a degree of uncertainty to these figures.

Between 2000 and 2013 the numbers of ruddy ducks in European states have followed two paths (Fig. 2). Control activities in the UK and Spain have resulted in significantly reduced numbers. Likewise, those states planning for or undertaking control of small numbers of ducks such as Switzerland, Iceland, Denmark, Portugal and Sweden have prevented populations from becoming established. In contrast, ruddy duck numbers have increased in France, the Netherlands and Belgium, although the effects of recently announced control programmes have yet to take effect. While the UK was host to the majority of the European ruddy duck population (Fig. 3) there was less incentive for neighbouring states to undertake control as

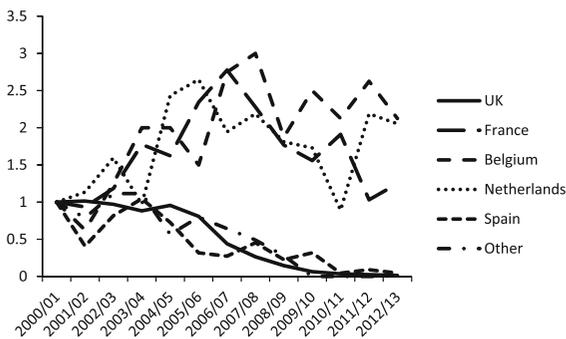
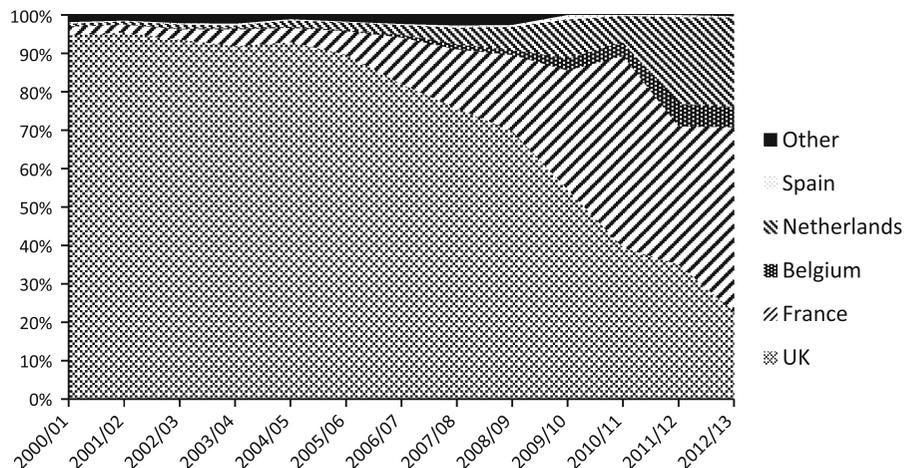


Fig. 2 The population trends of ruddy ducks in European countries 2000–2013 (Index values set at 1 in the first winter)

Fig. 3 The percentage of the reported European ruddy duck population found in different member states, 2000–2013



their small populations would likely be replenished from the UK. However, now that the risk of the UK acting as a source for the European mainland has been reduced, the emphasis needs to shift to coordinated control across the continent if the objective of eradication is to be achieved.

Despite actions at the national level, as yet there has been little effective international collaboration or coordination to fulfil the international action plan (Cranswick and Hall 2010). Addressing the IAS issue is one of six key objectives of the new EU 2020 Biodiversity Strategy adopted in May 2011. Recognising the increasingly serious problem of IAS and the need for international collaboration, the European Commission launched a proposed regulation on the prevention and management of the introduction and spread of IAS in September 2013. The European Commission has stated that ‘Invasive species are a major threat to biodiversity. Halting the loss of biodiversity in the EU will not be possible without tackling the problem of these unwelcome visitors. Given the way that these become quickly established and spread, measures taken by one Member State can have no effect if neighbouring countries fail to take action or respond in an uncoordinated manner. The ecological, economic and social consequences of the spread of invasive species for EU countries are serious and need a harmonised response.’ (European Commission-IP/08/1890 05/12/2008). As the ruddy duck already appears on Annex B of the EU Wildlife Trade Regulation it is likely to be listed as an IAS of Union Concern. If adopted, this would oblige member states to undertake management to eradicate the species.

Thus, the ruddy duck may provide a case study and a baseline against which to assess the consequences of any new legislation in promoting the effective continental scale management of IAS.

The objective of eradicating the ruddy duck from Europe appears to be achievable and substantial progress has been made. Methods to achieve large scale reductions in a national population have been developed in detail and successfully implemented. Coordination of activity at an international level—through shared commitments to achieve eradication, coordination of the timing of control, sharing of expertise and resources, together with unified reporting amongst European states—should realise the removal of the last 7 % of the population. Taking this activity forward alongside the implementation of the new EU legislative instrument offers the prospect of achieving the first continental scale eradication of a vertebrate IAS.

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