A review of the cause of the decline in the black-tailed godwit (*Limosa limosa limosa*) in the Netherlands

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The decline of the west European population of black tailed godwit (*Limosa limosa limosa*) has been so severe (c. 5% p.a.) that it prompted a workshop at the 2007 International Wader Study Group conference. Global experts on black-tailed godwits met to discuss the cause of the decline and to provide recommendations to improve the conservation of this subspecies. The workshop concluded that the available evidence strongly suggested that declines in breeding productivity resulting from agricultural intensification was the most likely driver of the decline (Gill et al. 2007). Breeding productivity has declined from c.0.7 chicks per pair (range: 0.5-1) in the 1980s to c.0.2 chicks per pair (range: 0.1 – 0.7) in recent years (Schekkerman et al. 2005). Since this workshop, a number of studies provide further evidence for the mechanisms driving the declines in this species. Approximately 85% of the black-tailed godwits in the Netherlands breed on intensively managed agricultural grasslands . These grasslands generally receive a high amount of fertiliser and are subject to mowing and/or grazing during the godwit-breeding season (Kleijn et al. 2010). It has long been known that mowing and grazing cause direct losses of nests and chicks (Kruk et al. 1997) and indirect reductions in chick survival by altering foraging conditions for chicks (Schekkerman and Beintema 2007). Schekkerman et al (2008), clearly show that godwit chick survival is the main demographic bottleneck which is driving population declines and that the main causal mechanism is early mowing of grassland, and that changes in vegetation structure and composition and increased predation could also be contributing to poor chick survival. Recent evidence shows that climate related advancement in mowing dates since the early 1980s, which has not been matched by any advancement of hatching date in godwits, means that a much higher proportion of nests, and young chicks suffer direct mortality from agricultural operations (Kleijn et al. 2010). Changes in the timing of mowing also means that much of the grassland habitat has been mown by the time any surviving nests hatch, reducing the availability of chick foraging habitat (Kleijn et al. 2010). Furthermore, climate related changes in the vegetation of the un-mown grassland results in very tall, dense swards which are much lower quality as chick foraging habitat (Kleijn et al. 2010).

There is also evidence that changes in predator control activities and landscape driven changes may have altered the abundance and distribution of the predators of wader nests and chicks, and this has increased nest and chick predation rates (Schekkerman et al. 2009; Teunissen et al. 2008). The impact of predators is very likely to be increasing because breeding populations are increasingly fragmented and chicks are more exposed and in poorer condition due to reduced foraging habitat and loss of cover from early mowing. Indeed, predation rates of godwit chicks in newly cut or grazed fields were twice as high as those in uncut fields (Schekkerman et al. 2009) and 65% of chick loss was through predation (Teunissen et al. 2008).

The studies described here provide compelling evidence that black tailed godwits are currently limited by poor breeding success that has declined in recent years. Agricultural practises, predation and climate change are interacting to create conditions in which godwits either fail to hatch young because they are mown or predated, or young cannot survive due to insufficient high quality foraging habitat and increased susceptibility to predation.

To date there is no conclusive evidence that godwit chick survival is constrained by a decline in the abundance of prey (of whatever size) that is not related to management such as earlier mowing or grazing. There is certainly no evidence that neonicotinoid insecticides are altering the abundance of godwit prey. In the Netherlands, neonicotinoid insecticides are being applied to maize and maize is being cultivated within the godwit breeding areas. However, godwits rarely breed on maize fields and chicks never forage on such fields (D. Kleijn pers. comm.). Neonicotinoid insecticides have also been found at considerable concentrations in surface waters particularly in areas with many glasshouses in the western polders. While this has potential to impact on aquatic invertebrates, most of the arthropod prey of godwit chicks is found in the taller swards of the grasslands. Water from surrounding ditches does not penetrate into the grassland soil; therefore, there is little chance that these insecticides will have an effect on the prey of godwit chicks. Furthermore, ornithologists in the Netherlands involved in the conservation of black-tailed godwits do not believe there is currently any causal evidence or even a high likelihood of an effect of neonicotinoid insecticides on black-tailed godwits prey.

Tennekes (2010) report does little more than highlight trends in godwit numbers. The suggestions about food shortage due to lack of prey > 4 mm are not corroborated by the unpublished studies Tennekes refers to in his report (D. Kleijn pers. comm.). Nowhere does Tennekes discuss alternative interpretations to his main theses and his report overlooks the peer-reviewed literature, mentioned above, that provides compelling evidence for the plight of godwits in the Netherlands.

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