Identifying priority areas for surveillance of H5N1 in wild birds in Great Britain

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Recent outbreaks of the H5N1 strain of avian influenza (AI) in Europe have highlighted the need for enhanced surveillance and early detection in order to reduce the likelihood of a major outbreak in the commercial poultry industry. Current AI surveillance in wild birds in Great Britain (GB) is carried out through a combination of sampling shot birds, live caught birds and through the collection of birds found dead and reported by members of the public. The work described here was carried out in 2006 in response to increased concern about the presence of H5N1 in Europe and the potential risks to the GB poultry industry. Using extensive monitoring data on 24 wild bird species considered most likely to introduce the virus into Great Britain and analyses of local poultry populations, an incursion risk profile was produced with the aim of identifying geographical areas where surveillance, particularly for the collection of dead birds for screening should be targeted. Areas were identified based on 1) abundance of high risk wild bird species and 2) risk from a domestic poultry perspective.

STEP 1: WILD BIRD AUNDANCE

Based on discussion with experts, 24 "high risk" migratory wild bird species were identified which winter in GB and were considered to have an increased probability of exposure to H5N1 outside the EU (Table 1).

Data from ten monitoring schemes were collated to provide an estimate of abundance (scored 1-5) of each of the 24 species per 10km national grid square for the months Oct-Dec.

Abundance scores were then summed across species for each 10km square to produce a combined wild bird species map. Squares were ranked and assigned a score of 1-6 indicating high (1) to low (6) abundance of the 24 wild bird species (Fig.1)

Table 1. Species considered to have increased probability of exposure to H5N1 outside the EU, which migrate to GB

Common name	Scientific name
Mute Swan	*Cygnus olor*
Whooper Swan	*Cygnus cygnus*
Bewick's Swan	*Cygnus columbianus*
Greater White-fronted Goose (European sub-species)	*Anser albifrons albifrons*
Brent Goose (dark-bellied sub-species)	*Branta bernicla bernicla*
Shelduck	*Tadorna tadorna*
Mallard	*Anas platyrhynchos*
Gadwall	*Anas strepera*
Northern Pintail	*Anas acuta*
Northern Shoveler	*Anas clypeata*
Eurasian Wigeon	*Anas penelope*
Common Teal	*Anas crecca*
Common Pochard	*Aythya ferina*
Tufted Duck	*Aythya fuligula*
Moorhen	*Gallinula chloropos*
Coot	*Fulica atra*
Northern Lapwing	*Vanellus vanellus*
Eurasian Golden Plover	*Pluvialis apricaria*
Snipe	*Gallinago gallinago*
Ruff	*Philomachus pugnax*
Black-headed Gull	*Larus ridibundus*
Common Gull	*Larus canus*
Herring Gull (Baltic sub-species)	*Larus argentatus argentatus*
Lesser Black-backed Gull (SW Scandinavian sub-species)	*Larus fuscus intermedius*

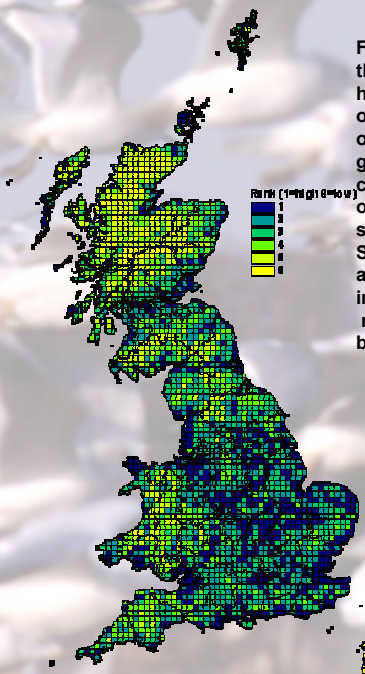

Figure 1. Wild bird abundance scores (ranked 1-6; high to low priority)

STEP 2: POULTRY INCURSION RISK

Using holding level information contained in the Great Britain Poultry Register (GBPR), all commercial poultry holdings with chickens, turkeys, geese or ducks were ranked according to the estimated likelihood of an incursion from a wild bird source.

Factors thought likely to increase the risk of incursion included having a greater number of poultry on the holding and keeping these outdoors, particularly if ducks or geese. Risk scores were calculated for each holding based on the above factors and then summed across 10km squares. Squares were ranked and assigned a score of 1-6 indicating high (1) to low (6) risk of incursion through wild birds (Fig.2).

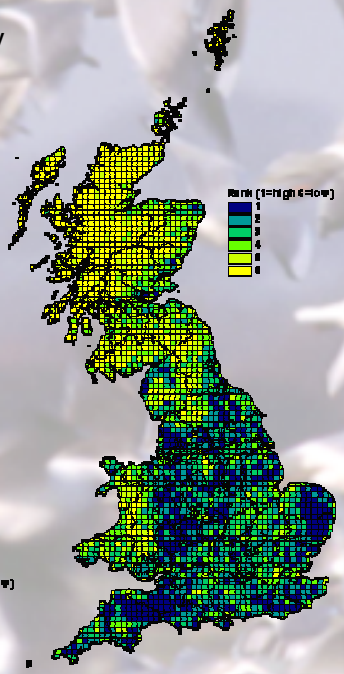

Figure 2. High priority areas based on likelihood of incursion in domestic poultry.

STEP 3: IDENITYING PRIORITY SURVEILLANCE AREAS

A single priority area map for surveillance was calculated as the product of the score of wild bird abundance (Fig.1) and the score for poultry risk (Fig.2) in each 10 km square (Fig.3).

Figure 3 suggests that surveillance would be best focused on areas of Norfolk, Suffolk, Lancashire, Lincolnshire, the southwest of England and the Welsh borders as these areas have significant poultry populations including a high number of free-range flocks and high abundance of the 24 wild bird species of highest concern.

The outputs can be updated to incorporate new wild bird or poultry data or to consider additional wild bird species as the international situation changes.

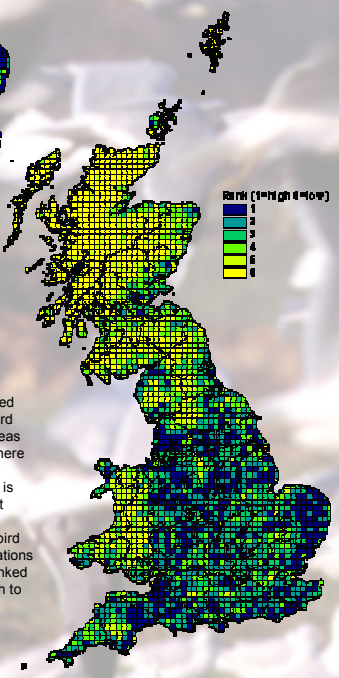

Figure 3. Combined poultry and wild bird scores to show areas of Great Britain where the probability of incursion of H5N1 is likely to be highest given our understanding of bird and poultry populations in those areas (ranked 1-6 in order of high to low priority).

This work has had important practical applications for contingency planning and for directing targeted surveillance in GB, and provides a model for the adoption of a comparable approach in other countries, where wild bird monitoring and poultry data are available.

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