**EVALUATION OF RED LISTED SPECIES IN THE SCANDINAVIAN AND BALTIC COUNTRIES (NORTHERN ZONE) BEING COVERED BY THE *NZ Pesticide risk assessment for birds and mammals Document***

**Selection of relevant focal bird species for higher tier risk assessment in the Northern Zone in accordance with   
Regulation EC 1107/2009**

**April 2020**

**Version 1.0**

**Additional information to   
Northern Zone 2020. Pesticide risk assessment for birds and mammals. Selection of relevant species and development of standard scenarios for higher tier risk assessment in the Northern Zone in accordance with Regulation EC 1107/2009. Version 2.0, April 2020**

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# Introduction

The default EFSA (2009) Tier 1 pesticide risk assessment is based on a ‘generic focal species’, i.e. not a real species, but a worst-case representative covering the risk of exposure for all species potentially occurring in a certain crop. In case a potential risk by a pesticide is indicated after the default Tier 1 risk assessment, exposure evaluation may be refined by considering a ‘focal species’, i.e. a real species that occurs in the crop at the time of application. Besides occurrence in the crop, such a species has to be representative (i.e. protective) for all other species potentially at risk. Within different feeding guilds (i.e. insectivores, herbivores, granivores, omnivores) and foraging strata, smaller species show a higher risk of exposure through to allometric metabolic rates. Therefore, risk assessments on smaller species cover exposure of larger species but not contrariwise. In conclusion, selection of Focal Species has to consider occurrence in the crop and size of a species as determinants.

During the revision process of the Northern Zone B&M GD version 2.0, April 2020, the question arose whether recommended focal species for higher tier risk assessments in the Northern Zone sufficiently cover the risk of exposure for endangered species listed in the Red Data Books for Northern Zone countries or not.

This document summarises results and conclusions of the evaluation of how previously determined focal species for environmental risk assessments cover Red List and threatened species. For birds the details are presented in the following giving the reasoning why some are added to the revised version 2.0, while others are not.

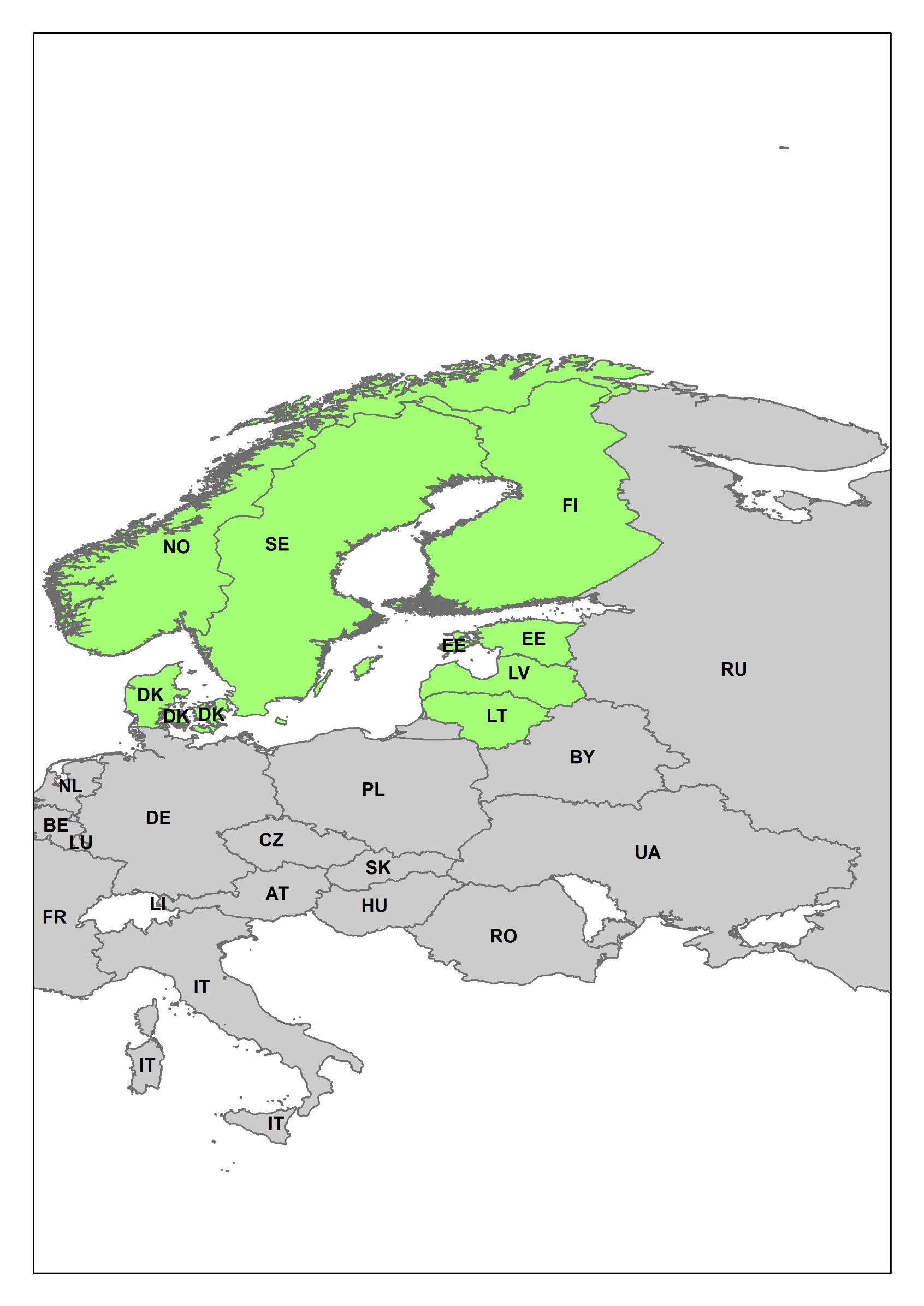
# Materials and Methods

The ‘Northern Zone’ includes the territories of the European Union’s (EU) Scandinavian and Baltic member states of Denmark (DK), Estonia (EE), Finland (FI), Latvia (LV), Lithuania (LT), Norway (NO) and Sweden (SE).

The following data sources were considered to compile Red Listed species of countries in the Northern Zone:

* Denmark: <http://roedliste.au.dk/gpdata.asp?ID=4&mode=default#up>, accessed May 2019.
* Estonia: Red Data Book of Estonia. 2008. Commission for Nature Conservation of the Estonian Academy of Sciences. <http://elurikkus.ut.ee/prmt.php?lang=eng>, accessed May 2019
* Finland: <https://www.ymparisto.fi/punainenlista>, accessed May 2019
* Latvia: <http://latvijas.daba.lv/aizsardziba/augi_dzivnieki/dz_tabula.shtml>, accessed May 2019
* Lithuania: <https://e-seimas.lrs.lt/portal/legalActEditions/lt/TAD/TAIS.219902>, accessed May 2019
* Sweden: <http://artfakta.artdatabanken.se/> (and in addition <http://www.fageltaxering.lu.se/kontakta>) accessed May 2019
* Norway: <https://www.artsdatabanken.no/Rodliste/Artsgruppene/Fugler>, accessed May 2019

Those Red List species potentially to be expected in farmland habitat were assigned to foraging guilds (granivorous, herbivorous, insectivorous, omnivorous, frugivorous) and data on average body weight per species was collected from standard ornithological references, e.g. Dunning 2008, Cramp & Simmons 1977-1994, Glutz et al. 1987-1997.



**Figure 1** *Countries of the ‘Northern Zone’ setting the geographical limits of the evaluation of Red List species. DK = Denmark, EE = Estonia, FI = Finland, LT = Lithuania, LV = Latvia, NO = Norway and SE = Sweden.*

For each foraging guild relevant for risk assessment according to EFSA (2009), species lists were compiled including body weight as a measure for size and for risk of exposure. Due to metabolic rates, smaller species generally show comparatively higher food intake rates per kg body weight (FIR/b.w.) than larger species of the same guild. Consequently, within each foraging guild a larger species will not cover the risk of exposure of species with distinctly (> 10%) lower body weight (b.w.). For the scope of this overview, it was investigated whether Red Listed bird species potentially occurring in farmland habitats are covered (i.e. are less than 10% smaller) by accepted focal species of the respective foraging guild. For species fulfilling this criterion further information on distribution, habitat and/or ecology are discussed.

# Results

A total of 228 species is included in the Red Lists of the above mentioned countries, categorized after IUCN criteria as (nationally) extinct (EX, RE), critically endangered (CR), endangered (EN), vulnerable (VU), or near threatened (NT) (Table 1).

**Table 1** *Red listed bird species in the Nothern Zone and species potentially at risk from pesticides in agricultural habitats (excluding waterbirds, seabirds and large raptors).*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Country** | **DK** | **EE** | **FI** | **LV** | **LT** | **NO** | **SE** | **Total** |
| Red List (no. spp.) | 66 | 24 | 121 | 79 | 77 | 82 | 55 | 226 |
| Potentially relevant for risk assessment | 27 | 12 | 62 | 29 | 25 | 36 | 33 | 103 |

Excluding mainly waterbirds (ducks, divers, loons, auks) and larger raptors, 103 species might be considered potentially at risk from pesticides used in agriculture (Table 2). For some species, there is no clear evidence that they actually do occur in farmland habitats but they could theoretically or closely related species do. As indicated above, b.w. is a crucial measure for protectiveness of one species to other species potentially at risk. To elucidate whether recommended Focal Species (Table 3) are representative also for Red Listed species the body weights of both groups are compared per diet guild (Fig. 2).

**Table 2** *Red listed bird species (alphabetical order) potentially at risk in agricultural habitats. Table shows IUCN criteria (nationally extinct (EX, RE), critically endangered (CR), endangered (EN), vulnerable (VU), or near threatened (NT)), body weight (b.w.) and assigned foraging guilds. Species in bold conventionally represent focal species in the Northern Zone.*

| **Species** | **DK** | **EE** | **FI** | **LV a** | **LT b** | **NO** | **SE** | **b.w. [g]** | **Guild** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *Acrocephalus dumetorum* |  |  |  |  |  |  | NT | 11.2 | insectivore |
| ***Alauda arvensis*** |  |  | **NT** |  |  | **VU** | **NT** | **37.2** | **omnivore** |
| *Anser anser* |  | NT |  | VU |  |  |  | 3108.0 | herbivore |
| *Anser erythropus* |  | VU | CR | CR | x | CR | CR | 1622.0 | herbivore |
| ***Anser fabalis fabalis*** |  | **VU** | **VU** |  |  | **VU** | **NT** | **2843.0** | **herbivore** |
| ***Anser fabalis rossicus*** |  |  | **EN** |  |  |  |  | **2374.0** | **herbivore** |
| *Anthus campestris* | CR |  |  | VU | x |  | EN | 23.0 | insectivore |
| *Anthus cervinus* |  |  | EN |  |  |  |  | 20.9 | insectivore |
| *Anthus pratensis* |  |  |  |  |  |  | NT | 18.4 | insectivore |
| *Anthus spinoletta* | NT |  |  |  |  |  |  | 23.9 | insectivore |
| *Apus apus* |  |  | EN |  |  |  |  | 37.6 | insectivore |
| *Arenaria interpres* | EN |  | EN |  |  |  |  | 134.0 | insectivore |
| *Athene noctua* | EN |  |  | VU | x |  |  | 164.0 | insectivore |
| *Branta leucopsis* | NT |  |  |  |  |  |  | 1586.0 | herbivore |
| *Buteo buteo* |  |  | VU |  |  |  |  | 781.0 | carnivore |
| *Buteo lagopus* |  |  | EN |  |  |  | NT | 847.0 | carnivore |
| *Calcalrius lapponicus* |  |  | NT |  |  | VU |  | 27.4 | omnivore |
| *Calidris alpina alpina* |  |  | NT |  | x |  |  | 55.4 | insectivore |
| *Calidris alpina schinzii* | EN |  | EN | CR |  |  |  | 44.2 | insectivore |
| *Calidris falcinellus* |  |  | NT |  |  |  |  | 37.1 | insectivore |
| *Calidris minuta* |  |  | CR |  |  |  |  | 21.1 | insectivore |
| *Calidris temminckii* |  |  | EN |  |  |  |  | 23.0 | insectivore |
| *Carduelis chloris* |  |  | EN |  |  |  |  | 27.8 | omnivore |
| *Carduelis flavirostris* |  |  | CR |  |  | NT | VU | 15.4 | granivore |
| *Carpodacus erythrinus* | VU |  | NT |  |  | VU | VU | 23.0 | omnivore |
| *Charadrius alexandrinus* | EN |  |  |  |  |  |  | 41.4 | insectivore |
| *Charadrius dubius* |  |  | NT |  |  | NT |  | 38.7 | insectivore |
| *Charadrius hiaticula* |  |  |  | VU | x |  |  | 63.3 | insectivore |
| *Charadrius morinellus* |  |  | VU |  |  |  |  | 100.0 | insectivore |
| *Ciconia ciconia* | CR |  |  |  |  |  | CR | 3473.0 | omnivore |
| *Ciconia nigra* | RE |  |  | VU | x |  | RE | 2926.0 | omnivore |
| *Circus aeroginosus* |  |  |  |  |  | VU |  | 492.0 | carnivore |
| *Circus cyaneus* | NA |  | VU | CR |  | EN | NT | 358.0 | carnivore |
| *Circus pygargus* | EN |  | CR | EN | x |  | EN | 261.0 | carnivore |
| *Columba oenas* |  |  |  | VU | x |  |  | 280.0 | omnivore |
| *Coracias garrulus* | RE | NT |  | CR | x |  | RE | 146.0 | insectivore |
| *Corvus frugileus* |  |  |  |  |  | NT |  | 488.0 | omnivore |
| *Coturnix coturnix* |  | NT | EN | EN |  | NT | NT | 90.0 | omnivore |
| *Crex crex* | NT | NT |  | EN | x | CR | NT | 142.0 | insectivore |
| *Cuculus canorus* |  |  |  |  |  | NT |  | 113.0 | insectivore |
| *Delichon urbica* |  |  | EN |  |  | NT | VU | 14.5 | insectivore |
| *Emberiza aureolus* |  |  | RE |  |  |  |  | 19.6 | omnivore |
| *Emberiza calandra* |  |  |  |  | x | RE | EN | 46.0 | omnivore |
| ***Emberiza citrinella*** |  |  |  |  |  | **NT** | **VU** | **26.5** | **omnivore** |
| *Emberiza hortulana* |  |  | CR |  | x | CR | VU | 23.8 | omnivore |
| *Emberiza pusilla* |  |  |  |  |  | VU | VU | 15.4 | omnivore |
| *Emberiza rustica* |  |  | NT |  |  | CR | VU | 20.1 | omnivore |
| *Emberiza schoeniclus* |  |  | VU |  |  | NT |  | 18.3 | omnivore |
| *Eremophila alpestris* |  |  | CR |  |  |  |  | 36.9 | omnivore |
| *Falco tinnunculus* |  |  |  | CR | x |  |  | 186.0 | carnivore |
| *Fringilla montifringilla* | NA | VU | NT |  |  |  |  | 24.0 | omnivore |
| *Galerida cristata* | CR | CR |  | VU |  | RE |  | 39.0 | omnivore |
| *Gallinago gallinago* |  |  | NT |  |  |  |  | 97.0 | insectivore |
| *Grus grus* | LC |  |  | VU |  |  |  | 5500.0 | omnivore |
| *Haematopus ostralegus* |  |  |  | VU | x |  |  | 526.0 | insectivore |
| *Hirundo rustica* |  |  | VU |  |  |  |  | 15.8 | insectivore |
| *Iduna caligata* |  |  | VU |  |  |  |  | 8.9 | insectivore |
| *Lanius excubitor* | EN |  |  | VU |  |  |  | 65.6 | insectivore |
| *Larus argentatus* |  |  | VU |  |  |  |  | 1044.0 | omnivore |
| *Larus canus* |  |  |  |  |  | NT |  | 375.0 | omnivore |
| *Larus fuscus* |  |  | EN |  |  |  |  | 662.0 | omnivore |
| *Larus marinus* |  |  | VU |  |  |  |  | 1488.0 | omnivore |
| *Larus ridibundus* |  |  | VU |  |  | VU |  | 284.0 | omnivore |
| *Limosa lapponica* |  |  | NT |  |  |  |  | 276.0 | insectivore |
| *Limosa limosa* | VU | NT | VU | EN | x | EN | CR | 252.0 | insectivore |
| *Locustella fluviatilis* | NA |  |  |  |  |  |  | 16.1 | insectivore |
| *Locustella naevia* |  |  |  |  |  | NT |  | 13.3 | insectivore |
| *Lullula arborea* | NT |  | NT |  |  | NT |  | 26.9 | omnivore |
| *Luscinia svecica* | LC |  |  | NT | x | NT |  | 18.2 | insectivore |
| *Lymnocryptes minimus* |  |  |  | EX |  |  |  | 46.7 | insectivore |
| *Merops apiaster* | NA |  |  |  |  |  |  | 56.6 | insectivore |
| ***Motacilla alba*** |  |  | **NT** |  |  |  |  | **21.0** | **insectivore** |
| *Motacilla cinerea* |  |  | VU |  |  |  |  | 17.2 | insectivore |
| *Motacilla citreola* |  |  | EN |  | x |  |  | 20.3 | insectivore |
| *Numenius arquata* | NT |  | NT | EN | x | VU | NT | 742.0 | insectivore |
| *Numenius phaeopus* |  |  |  | VU |  |  |  | 355.0 | insectivore |
| *Oriolus oriolus* | CR |  | EN |  |  |  | VU | 79.0 | insectivore |
| *Passer domesticus* |  |  | EN |  |  |  |  | 27.4 | omnivore |
| ***Perdix perdix*** |  | **NT** | **NT** | **EN** | **x** | **RE** | **NT** | **381.0** | **omnivore** |
| *Philomachus pugnax* | EN | EN | CR | EN | x | EN |  | 102.0 | insectivore |
| *Phoenicurus ochruros* |  |  | NT |  |  | VU |  | 16.5 | insectivore |
| *Phylloscopus borealis* |  |  | EN |  |  | EN | EN | 11.2 | insectivore |
| *Phylloscopus trochiloides* | NA |  |  |  |  |  | NT | 7.1 | insectivore |
| *Pica pica* |  |  | NT |  |  |  |  | 166.0 | omnivore |
| *Plectrophenax nivalis* |  |  | VU |  |  |  |  | 42.2 | omnivore |
| *Pluvialis apricaria* | CR |  |  | VU | x |  |  | 214.0 | insectivore |
| ***Saxicola rubetra*** |  |  | **VU** |  |  |  | **NT** | **16.6** | **insectivore** |
| *Saxicola rubicola* | NT |  |  |  |  | EN | EN | 15.3 | insectivore |
| *Serinus serinus* | VU |  |  |  |  |  | VU | 11.2 | granivore |
| *Streptopelia decaocto* |  | NT | EN |  |  | NT |  | 146.0 | omnivore |
| *Streptopelia turtur* | NT |  | CR |  | x |  |  | 132.0 | omnivore |
| *Sturnus vulgaris* |  |  |  |  |  | NT | VU | 79.9 | omnivore |
| ***Sylvia communis*** |  |  | **NT** |  |  |  |  | **14.5** | **insectivore** |
| *Tringa erythropus* |  |  | NT |  |  |  |  | 158.0 | insectivore |
| *Tringa glareola* | VU |  | NT |  | x |  |  | 62.0 | insectivore |
| *Tringa nebularia* |  |  | NT |  |  |  |  | 187.0 | insectivore |
| *Tringa ochropus* | VU |  |  |  |  |  |  | 71.4 | insectivore |
| *Tringa stagnatilis* |  |  | EN | VU |  |  |  | 77.5 | insectivore |
| *Tringa totanus* |  |  | NT | EN | x |  |  | 129.0 | insectivore |
| *Turdus iliacus* | NA |  |  |  |  |  |  | 61.2 | omnivore |
| *Turdus torquatus* |  |  | VU |  |  |  |  | 109.0 | omnivore |
| *Upupa epops* | RE |  |  | EN | x |  | RE | 61.4 | insectivore |
| *Vanellus vanellus* |  |  |  |  |  | EN |  | 211.0 | insectivore |

a) Categorization differs from IUCN criteria, but Latvian categories are approximately equivalent to IUCN criteria (in brackets) as follows: 0 (=EX), I (=CR), II (=EN), III (=VU) and IV (=NT)

b) Red List for Lithuania compiles endangered species (=”x”) but provides no information on IUCN criteria.

**Table 3** *Recommended focal species (alphabetical order) for higher tier risk assessment in the Northern Zone with body weight and feeding guild. Species in bold are Red Listed in at least one country of the Northern Zone (cf. Table 2)*

|  |  |  |
| --- | --- | --- |
| **Species** | **b.w. [g]** | **Guild** |
| ***Alauda arvensis*** | **37.2** | **omnivore** |
| *Anser brachyrhynchos* | 2450.0 | herbivore |
| ***Anser fabalis*** | **2374.0** | **herbivore** |
| *Carduelis cannabina* | 15.3 | granivore |
| *Columba palumbus* | 435.0 | omnivore |
| ***Emberiza citrinella*** | **26.5** | **omnivore** |
| *Erithacus rubecula* | 16.5 | insectivore |
| *Fringilla coelebs* | 21.0 | omnivore |
| ***Motacilla alba*** | **21.0** | **insectivore** |
| *Motacilla flava* | 17.5 | insectivore |
| *Parus caeruleus* | 11.0 | insectivore |
| ***Perdix perdix*** | **381.0** | **omnivore** |
| *Phylloscopus trochilus* | 9.5 | insectivore |
| ***Saxicola rubetra*** | **16.6** | **insectivore** |
| *Sturnus vulgaris* | 75.0 | omnivore |
| ***Sylvia communis*** | **14.5** | **insectivore** |

The comparison of Red Listed species with recommended Focal Species indicates an adequate representativeness of the latter by measure of body weight, i.e. most Focal Species candidates represent rather small species within their respective foraging guild. Please note that depending on crop growth stages relevance of species may change during crop development and larger species may still be representative for specific scenarios when smaller species do not occur in the respective crop. However, some Red Listed species are smaller than recommended Focal Species of their guild, including insectivores (5 species), herbivores (2 species), granivores (1 species) and omnivores (7 species). Ten of these species are Red Listed in only one or two countries and rather are relevant only from a national perspective. This leaves five species categorized as threatened in three or more out of seven countries (Table 4), requiring further consideration regarding the zonal scale.



**Figure 2** *Comparison of body weight (b.w.) of species on national Red Lists (dots) and recommended Focal Species for the Northern Zone (squares) separated for feeding guilds.*

**Table 4** *Red Listed species potentially not adequately covered by recommended Focal Species in the Northern Zone. Highlighted species are Red Listed in ≥3 countries and potentially of zonal relevance*

|  |  |  |  |
| --- | --- | --- | --- |
| **Species** | **No of countries the species is Red listed** | **b.w. [g]** | **Guild** |
| *Acrocephalus dumetorum* | 1 | 11.2 | insectivore |
| ***Anser erythropus*** | **6** | **1622.0** | **herbivore** |
| *Branta leucopsis* | 1 | 1586.0 | herbivore |
| ***Carpodacus erythrinus*** | **4** | **23.0** | **omnivore** |
| *Emberiza aureolus* | 1 | 19.6 | omnivore |
| ***Emberiza hortulana*** | **3** | **23.8** | **omnivore** |
| *Emberiza pusilla* | 2 | 15.4 | omnivore |
| ***Emberiza rustica*** | **3** | **20.1** | **omnivore** |
| *Emberiza schoeniclus* | 2 | 18.3 | omnivore |
| *Fringilla montifringilla* | 2 | 24.0 | omnivore |
| *Iduna caligata* | 1 | 8.9 | insectivore |
| *Locustella naevia* | 1 | 13.3 | insectivore |
| ***Phylloscopus borealis*** | **3** | **11.2** | **insectivore** |
| *Phylloscopus trochiloides* | 1 | 7.1 | insectivore |
| *Serinus serinus* | 2 | 11.2 | granivore |

There is no detailed information whether and, if so, how frequently Red Listed species occur in specific crops and during which growth stages. The assumption of a potential exposure to pesticides is theoretical and represents a worst-case scenario rather than real evidence.

# Discussion

Five species are Red Listed in at least three NZ member states, potentially occur in farmland habitats (arable, horticulture) and are > 10% smaller by measure of body weight than otherwise recommended focal species.

Lesser White-fronted Goose (*Anser erythropus*) is categorized as ‘critically endangered’ (FI, LV, NO, SE) or ‘vulnerable’ (EE) in five countries and Red Listed also in LT. Migrating and wintering birds often associate with more common White-fronted Geese (*A. albifrons*) and may visit arable fields for foraging. Threat status and potential risk of exposure trigger consideration of this species in risk assessments. *A. erythropus* (1,622 g) is clearly smaller than the recommended focal species Bean Goose (*A. fabalis*, 2,374 g) and Pink-footed Goose (*A. brachyrhynchos*, 2,450 g), and the risk might not be covered by the larger species.

***In conclusion, A. erythropus should be considered for herbivorous scenarios in risk assessments in the North Zone.***

The Scarlet Rosefinch (*Carpodacus erythrinus*) is reckoned as ‘vulnerable’ (DK, NO, SE) or ‘near threatened’ (FI) in four countries. However, it is unlikely to be exposed to pesticides because it mainly inhabits bushy off-crop areas. Furthermore, it shows a very short presence in its European breeding grounds (May to July) and migrating birds prefer similar habitats as breeding birds. The species is confined to off-crop margins of fields or orchards rather than in-crop areas. Average body weight (23 g) is only slightly below that of the smallest FS candidate (*Emberiza citrinella*, 26.5 g).

***It is considered that this species is adequately covered by recommended Focal Species and risk of exposure is low due to habitat selection.***

Ortolan Bunting (*Emberiza hortulana*) is ‘critically endangered’ (FI, NO) and ‘vulnerable’ (SE) in three Northern Zone countries and also Red Listed in LT. The species is usually associated with cultivated land (breeding, migration) and the long-term decline in Europe is attributed to agricultural practice. Regarding body weight, *E. hortulana* (23.8 g) is close to the generally accepted FS (*E. citrinella*, 26.5 g). Assuming similar diet and habitat, *E. hortulana* is probably sufficiently represented by the closely related *E. citrinella*, but its smaller size combined with a strong association to arable habitats slightly increases risk of exposure compared to the larger FS.

***As conservative approach* E. hortulana *will be considered as Focal Species in arable crops of the Northern Zone.***

Rustic Bunting (*E. rustica*) is listed ‘critically endangered’ (NO), ‘vulnerable’ (SE) and ‘near threatened’ (FI) in three countries. According to general references, the species is unlikely to occur in agricultural habitats on a regular basis. It favors low spruce-dominated mires. The size is clearly smaller (20.1 g) than that of the related *E. citrinella* (26.5 g), but is probably covered by the smaller Ortolan Bunting (23.8 g, see above).

***The distinct habitat preferences don’t trigger a risk assessment for* E. rustica *with regard to environmental risk assessments for farmland birds in the Northern Zone..***

Arctic Warbler (*Phylloscopus borealis*) is considered ‘endangered’ (FI, NO, SE) in three countries but mainly inhabits various types of coniferous, deciduous and mixed forests. It is unlikely to be present in agricultural habitats, including orchards, during the breeding season or during migration periods on a regular basis. Although average body weight is with 11.2 g slightly below the smallest insectivorous FS (*Sylvia communis*, 14.5 g) in farmland habitats. For forestry uses, even smaller insectivorous species like Goldcrest (*Regulus regulus*, 5.7 g), Blue Tit (*Cyanistes caeruleus*, 11 g), Common Treecreeper (*Certhia familiaris*, 9.5 g) are now considered as focal species (Northern Zone 2020), protecting the larger Arctic Warbler.

***The distinct habitat preferences do not trigger a risk assessment for* P. borealis in agricultural and forestry uses in the Northern Zone*.***

# Conclusions

For conservative wildlife risk assessment in the Northern Zone, Lesser White-fronted Goose and Ortolan Bunting are to be considered for large herbivore and small omnivore exposure scenarios, respectively. As indicated by body weight, these endangered species are otherwise not sufficiently covered by conventional focal species in dietary risk assessments. Other species should be protected by general focal species or are unlikely to be exposed to pesticide applications in agriculture, horticulture or forestry. For mammals no change of Focal Species seems necessary due to Red Listed species (see also section 3 in Northern Zone 2020; detailed mammalian data will be added in this document in the next revision).

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