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THE BIRDS OF THE NORTHERN AIR, NIGER

by J. NEWBY, J. GRETTEBERGER & J. WATKINS

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INTRODUCTION

The Air is a loose assembly of plateaux, valleys and rocky massifs lying on the southern edge of the Sahara in Northern Niger. Covering some 125,000 km², it can be likened to a peninsula of sahelian and sub-desert habitats extending out into a sea of desert - the Sahara. Its oasis-like character makes it singularly attractive to birds and one finds a rare mix of sahelian and saharan species. It is also an important over-wintering ground for Palaearctic migrants.

Whilst much sahelo-saharan ornithology has been undertaken only in the last 20 years, the avifauna of the Air has attracted the attention of travellers and scientists since the early part of the century. Both Rodd and Buchanan explored the area during the early 1920s and the fruits of the latter's collections have been described by Hartert (1921, 1924). Following the British, a number of French ornithologists also studied the Air's avifauna (Villiers 1950, Bruneau de Mire 1957, Fairon 1975).

None of these observers, however, was able to spend long periods of time in the field. Whilst recording the majority of the commoner resident and migrant species during their respective stays, they were unable to build up a complete picture of the avifauna's composition or of the abundance, reproductive status and habitat preferences of the individual species.

In 1979, the World Wildlife Fund and the Zoological Society of London mounted a joint-expedition to study the ecology of the Northern Air. The ornithological observations made during the expedition (Newby & Jones 1980) were to be the basis of a long-term study now in its 7th year. Between 1979-1986, observations were made during regular fieldtrips throughout the area. These were supplemented by longer periods of intensive birdwatching in regularly visited sites and by occasional mist-netting.

THE STUDY AREA

The study area in Northern Niger is bounded by the limits of a proposed national nature reserve (Figure 1). When established, the reserve will cover 77,360 km² (about twice the size of Switzerland) of arid and hyperarid desert and sub-desert habitats. The reserve lies approximately between latitudes 17°- 20°30'N and 08°- 11°00' meridians East.

Geographically, the area consists of part of the Ténéré desert to the east - a mixture of flat regs and sandy ergs - and the Air itself in the west, with its rocky massifs and outcroppings, interspersed with plateaux and wide valleys. Elevations range from between 500 m in the Ténéré to 1998 m on Mt. Tamgak.

The area lies at the northern limit of the West African tropical monsoonal

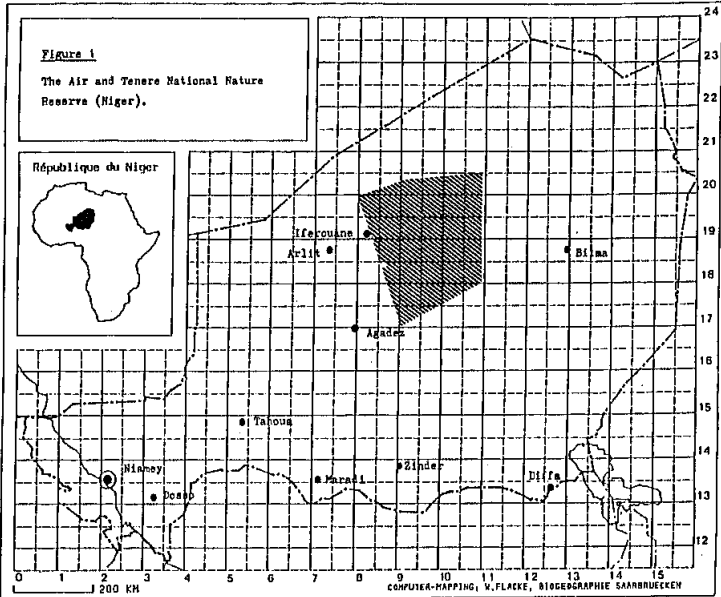
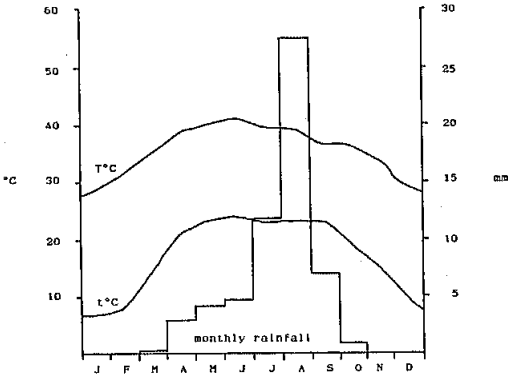


Figure 3

Rainfall (monthly averages) and temperature (average monthly maxima ($T^{\circ}\text{C}$) and minima ($t^{\circ}\text{C}$)) data for the Northern Air. Weather station: IFEROUANE (alt. 653 m), coordinates - $19^{\circ}04'N$ $08^{\circ}35'E$.



weather system and rainfall occurs mainly during July and August (Figure 2). Average annual rainfall is about 50 mm but this can vary enormously and many areas remain without rain for years at a time. Temperatures are extreme, reaching 45°- 50°C during April-June, and dropping as low as -4°C during December and January (Figure 2). Average annual maximum and minimum temperatures are in the order of 35° and 15°C.

PRINCIPAL HABITATS OF THE NORTHERN AIR

In spite of its overall aridity, the Air is composed of a relatively diverse array of habitats, ranging from high mountain through lower plateaux and valleys into open desert. The Air itself is dissected by a wealth of temporary watercourses or wadis, and although they rarely flow, they provide suitable substrates for the development of a varied vegetation of trees, shrubs, grasses and forbs. Although there are a large number of transitional habitats, as far as this study is concerned, 5 major habitat types have been retained.

1. Mountains

The rocky massifs of the N. Air dominate the surrounding topography. Altitudes reach almost 2000 m on the Tamgak and most of the other massifs attain heights of between 1000-1500 m (Greboun, Tin Galene, Agueraguer, etc.). Although apparently hostile to life, the dark, heavily eroded mountains give rise to numerous drainage channels and wadis that range from a few centimeters to many meters in width. The drainage features support a sparse but varied flora, dominated by small trees (*Acacia* spp.) and perennial grasses (*Cymbopogon*, *Enneapogon*, *Chrysopogon*). Following rainfall, rock-pools are formed in the wadis and although most are ephemeral, some are permanent. The larger pools often form the nuclei of surprisingly richly-vegetated micro-habitats, with stands of *Tamarix* and *Ficus* trees and dense growths of *Typha* and *Phragmites* rushes. The value of the rock-pools to resident and migratory birds cannot be overstated. Major users include sandgrouse *Pterocles* spp., rock dove, *Columba livia*, rock bunting, *Emberiza tahapisi*, trumpeter bullfinch, *Rhodopechys githaginea* and a variety of migratory ducks, herons and waders. The mountainous areas also provide ideal breeding sites for a number of species - Egyptian vulture, *Neophron percnopterus*, peregrine, *Falco peregrinus*, pale crag martin, *Hirundo obsolata* and the white-crowned black wheatear, *Oenanthe leucopyga*.

2. Plateaux

The major massifs are surrounded by plateaux varying in type from sandy or gravelly plains to hamada-like regs. Their altitudes range from 600-1000 meters. Drainage patterns are generally diffuse and support a rather sparse perennial vegetation composed of small trees and shrubs (*Acacia*, *Maerua*) and tussock-forming grasses (*Panicum*, *Lasiurus*, *Cymbopogon*). Ecologically, much of the plateau habitat resembles sahelo-saharan sub-desert country and harbours a similar avifauna: ostrich, *Struthio camelus*, cream-coloured courser, *Cursorius cursor*, spotted sandgrouse, *Pterocles senegallus*, hoopoe, *Upupa epops*, hoopoe larks, *Alaemon alaudipes* and desert lark, *Ammomanes deserti*. During wet years, the sandier plateaux develop rich grasslands and ideal breeding habitats for white-fronted finch-lark, *Eremopterix nigriceps*, and desert fantail warbler, *Cisticola*

aridula. Palaearctic migrants visiting the grasslands include pallid harrier, Circus macrourus, kestrel, Falco tinnunculus, quail, Coturnix coturnix and short-toed lark, Calandrella cinerea.

3. Large wadis and fringing floodplains

This habitat type is biologically the richest of the entire zone. Although the wadis rarely flow each year, they support a rich and varied flora dominated by trees and shrubs (Acacia, Balanites, Maerua, Ziziphus, Salvadora). Whilst most of the birds observed in the N. Air have been recorded from this habitat type at one time or another, many are found nowhere else: hoopoe, yellow-fronted barbet, Pogoniulus chrysoconus, least grey woodpecker, Dendropicos elachus and the beautiful long-tailed sunbird, Nectarinia pulchella. With their abundance of insectlife, the wadis also attract large numbers of passage and overwintering migrants.

4. Desert

The hyperarid and very sparsely vegetated environment of the desert regs and sand-seas offers little attraction to birdlife on a permanent basis and only a few migratory and resident species have been recorded from it. Occasionally, lanner falcons, Falco biarmicus, will nest on rocky outcrops, rearing their offspring on migrating birds as well as reptiles, scorpions and other arthropods (Newby 1981). In years when rain falls in the desert, quite rich but ephemeral pastures grow and temporarily at least, a few birds can be seen exploiting them: hoopoe lark, cream-coloured courser and migrating swallows and wagtails.

5. Gardens

The gardening oases of the N. Air are understandably attractive to a wide range of birds. Gardens at Iferouane, Tin Telloust and Zomo are irrigated year-round from shallow wells and form idyllic patches of vegetation in an otherwise inhospitable milieu. The crops grown (maize, millet, wheat, vegetables) provide shelter and attract an abundance of insects. The presence of open water in the irrigation channels draws both the more water-dependent resident birds - doves Streptopelia spp., house bunting, Emberiza striolata, Senegal fire-finch, Lagonosticta senegala, warbling silverbill, Lonchura malabarica - and a large variety of tired and thirsty passage migrants.

THE BIOGEOGRAPHY OF THE NORTHERN AIR'S AVIFAUNA

Although the Air can be broadly considered a sahelian enclave within a predominantly saharan environment, in reality the area is a mosaic of arid and hyperarid habitats. Whilst some birds are extremely site or habitat specific in their distribution, the majority are not. Their ability to exploit and move between a range of arid habitats is undoubtedly a response to widespread seasonal or annual fluctuations in food occurrence and abundance. Although a description of the Northern Air's avifauna on the basis of habitat preferences has a certain value, it seems more useful to treat it in the context of biogeographical criteria and to relate this to the status of individual species as either residents or visitors to the area under study.

Resident avifauna

In spite of the Air's dual sahelian/saharan nature, it would be an oversimplification to conveniently divide its avifauna into these 2 broad biogeographical components. Whilst the sahelian element is readily described, the remainder cannot simply be assigned to an homogenous saharan group. Casselton (1984) has correctly queried the existence of a truly representative saharan avifauna, and the majority of saharan breeding species tabulated by him are restricted to the largely atypical habitats of the massifs, the Nile Valley and the fringing habitats and oases. Whilst birds from these habitats do periodically colonise or frequent open desert country, none are truly resident. It might simply be a question of defining the Sahara's ecological limits, though a number of species would be more correctly assigned to a distinct and identifiable sahelio-saharan ecosystem. Although transitional in nature, this broad band of sub-desert habitats, lying between the Sahara and the Sahel, has a faunal and floral identity of its own. Consequently, the birds resident to the study area have been assigned to the following components.

Sahelian component

By and large, the sahelian species are confined to the most densely wooded areas of the Northern Air. Whilst some (grey woodpecker, Mesopicos goertae, Vieillot's barbet, Lybius vieilloti, grey-headed sparrow, Passer griseus) are widely dispersed, others enjoy a more localised distribution: rosy-grey dove, Streptopelia roseogrisea, common bulbul, Pycnonotus barbatus, Senegal fire-finch. As in other saharan fringing massifs (Tibesti, Ennedi, Adrar des Iforghas), the Air's wooded habitats enable sahelian species to reach abnormally northern limits to their ranges.

Prolonged drought and desertification are continually isolating the Air's sahelian habitats from comparable neighbouring ones. In many ways, they are already isolated and the Air is separated from the true sahelian zone by a large and expanding band of open, sub-desert country. Although theoretically mobile, many species have already become isolated from neighbouring populations. A number of birds are either extremely rare or highly localised in distribution and might already be classified as relict species e.g. common bulbul, grey-backed eremomela, Eremomela icteropygialis. This type of isolation may have interesting consequences for the evolution of these birds.

Saharan montane component

A number of species recorded from the N. Air belong to a well-defined saharan montane avifauna and their occurrence outside of this ecosystem is rare or ephemeral. The group includes Lichtensteins's sandgrouse, Pterocles lichtensteinii, the white-crowned black wheatear, and the blackchat, Cercomela melanura.

Sahelo-saharan component

This component is well represented within the study area, though none of the species is restricted entirely to it. The group includes the ostrich, the Nubian bustard, Neotis nuba, the spotted sandgrouse and the desert lark. Of the resident species, they are amongst the most mobile, their distribution and abundance probably fluctuates in accordance with the

availability of food.

Whilst it is assumed that the resident species all breed within the study area, corroborative data is still lacking for a number of them. Appendix 1 presents known breeding data.

Temporary residents and passage migrants

Apart from its resident species, the study area is frequented by a wide variety of temporary visitors and passage migrants. These can be assigned to a number of biogeographical components.

Afrotropical component

Many afrotropical birds show a marked tendency to extend their ranges temporarily during the wet season. Extremely wet years can produce a remarkable increase in the number and variety of visiting species - even to normally arid desert and sub-desert regions. The N. Air is no exception, though being at the limit of the monsoonal rainfall system, it rarely enjoys the abundant rainfall required to attract and maintain a large array of temporary visitors. In keeping with the desire to demonstrate the biogeographical make-up of the study area's avifauna, it is useful to split the afrotropical component into local and long-distance migrants.

Local migrants

As observed in many parts of the Sahel, the wet season is accompanied by a northwards extension in the ranges of many sahelian and sudano-sahelian birds (Salvan 1967-69, Newby 1979-80, Lamarche 1980-81, Gee 1984). Regular visitors to the study area include the Abyssinian roller, Coracias abyssinicus, crested lark, Galerida cristata, white-fronted finch-lark, E. nigriceps, and one species of night jar, Caprimulgus climacurus. In some areas of the Sahel, local resident populations of some species find their ranks swelled by wet season visitors from neighbouring populations. In the Air, several species disappear during certain periods of the year, especially the wet and early cold seasons (August-January). It appears that this phenomenon chiefly concerns granivorous birds, especially the mourning, Streptopelia decipiens, rosy-grey and long-tailed doves, Oena capensis. Whilst it is fairly easy to understand the reason for the disappearance of these seed-eating species, that of the rufous scrub-robin, Cercotrichas galactotes, and the pied crow, Corvus albus, requires further investigation. In general it can be stated that aridland avifauna maintains mobility and migratory tendencies to compensate for climatic vagueries and to exploit the opportunities offered by seasonally good periods of food availability.

Long-distance afrotropical migrants

This small group includes: white-throated bee-eater, Merops albicollis, Abdim's stork, Ciconia abdimii, and the pied cuckoo, Cuculus jacobinus, that parasitises the resident fulvous babbler, Turdoides fulvus.

Palearctic component

Both Moreau (1972) and more recently, Pettet (1984) have treated the

subject of trans-saharan bird migration. For those birds unable to breach the desert and sub-desert regions on their annual migrations, the well-wooded valleys of the Air offer attractive chances for food and shelter. The study area's palaeartic birds can be divided into 2 groups - passage and over-wintering migrants.

Passage migrants

The study area is regularly visited by a diverse array of passage migrants. As in most sahelian areas, the autumn migration is far more obvious, with a number of species spending time in favourable habitats before moving on. Regularly observed passage migrants include swallows, Hirundo rustica, sand martins, Riparia riparia, and house martins, Delichon urbica; yellow wagtails (several races), Motacilla flava; spotted flycatcher, Muscicapa striata; and a variety of Sylvia and Phylloscopus warblers.

Over-wintering migrants

Although many of the palaeartic birds merely pass through the study area, a fair number over-winter within its confines. These include the blue rock-thrush, Monticola saxatilis, the pied wagtail, Motacilla alba; desert wheatear, Oenanthe deserti, and a variety of Sylvia warblers.

To complete the biogeographical survey of the birds of the Northern Air, a group of North African palaeartic birds needs mentioning. These include the mourning wheatear, Oenanthe lugens, Seeborn's wheatear, Oenanthe o. seebornii and the pallid swift, Apus pallidus. This latter is in fact a summer visitor to the Air, breeding on cliffs and in caves in the massif's deeply incised valleys.

By way of a synopsis, Figure 3 summarises the biogeographical affinities of the 141 species so far recorded in the Northern Air.

SUMMARY

The avifauna of the Northern Air (Niger) has been studied for seven years. The area, shortly to become a national nature reserve, consists of a wide variety of arid and hyperarid environments. Some characteristic birds of 5 major habitat types are mentioned and a survey is presented of the biogeographical composition of the area's avifauna. An appendix presents data on the occurrence, biogeographical affinities, relative abundance and breeding status of the 141 species recorded to date.

RESUME

La faune avienne de l'Air septentrional (Niger) est l'objet d'une étude actuellement dans sa septième année. La zone, qui deviendra bientôt une réserve naturelle nationale, se compose d'une variété d'habitats arides et hyperarides. Quelques oiseaux caractéristiques des 5 habitats principaux sont mentionnés et des données sur la composition biogéographique de l'avifaune de la région sont présentées. Des données sur la présence, les affinités biogéographiques, l'abondance relative et la reproduction des 141 espèces d'oiseau déjà enregistrées, sont présentées dans une annexe.

Figure 3. Resume of the biogeographical affinities of the avifauna of the Northern Air (Niger).

TOTAL BIRD SPECIES RECORDED: 141

RESIDENT AVIFAUNA: 60 (43%)

Sahelian component: 31 (22%)

Saharan montane component: 12 (9%)

Sahelo-saharan component: 17 (12%)

TEMPORARY RESIDENTS/PASSAGE MIGRANTS: 81 (57%)

Afrotropical component: 14 (9%)

Local migrants: 11 (7%)

Long-distance migrants: 3 (2%)

Palaeartic component: 67 (48%)

Passage migrants: 54 (38%)

Over-wintering migrants: 12 (9%)

Breeding visitors: 1 (1%)

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	J	F	M	A	M	J	J	A	S	O	N	D	1	2	3
<i>Struthio camelus</i>	X	X	X	X	X	X	X	X	X	X	X	X	RSS	F	+
<i>Nycticorax nycticorax</i>							C		X				PPM	R	-
<i>Egretta garzetta</i>					X								PPM	R	-
<i>Ardeola ralloides</i>									X	X			PPM	R	-
<i>Ardea cinerea</i>								C	C	C	X		PPM	R	-
<i>Ardea purpurea</i>					C								PPM	R	-
<i>Ciconia ciconia</i>	X	X	X	C	X	C							PPM	O	-
<i>Ciconia abdimii</i>					X								ALD	R	-
<i>Anas acuta</i>	X								X			X	PPM	R	-
<i>Aegypius tracheliotus</i>	X	X	X	X	X	X	X	X	X	X	X	X	RSS	F	+
<i>Gyps fulvus</i>						X							PPM	R	-
<i>Gyps ruppellii</i>					X		X						ALM	R	-
<i>Neophron percnopterus</i>	X	X	X	X	X	X	X	X	X	X	X	X	RSS/RSS	F	+
<i>Circus macrourus</i>				X		X							PPM	O	-
<i>Circus pygargus</i>				X									PPM	R	-
<i>Circaetus gallicus</i>				X	X	X		X					PPM	O	-
<i>Melierax metabates</i>	X			X	X	X	X	X		X	X	X	RS/RSS	F	+
<i>Buteo rufinus</i>				X	X				X	X			PPM	O	-
<i>Polemaetus bellicosus</i>			X	X	X	X	X	X	X				ALM	F	-
<i>Hieraetus pennatus</i>			X						X				PPM	R	-
<i>Aquila verreauxii</i>			X			X							RSM	R	+
<i>Aquila rapax</i>										X			ALM	R	-
<i>Milvus migrans</i>									X				ALM/PPM	R	-
<i>Falco biarmicus</i>	X	X	X	X	X	X	X	X	X	X	X	X	RSS/RSM	F	+
<i>Falco tinnunculus</i>	X	X	X	X	X	X	X	X	X	X	X	X	RS/POM	F	?
<i>Falco peregrinus</i>	X	X			X								RSM	R	+
<i>Coturnix coturnix</i>									X	X			PPM/POM	R	-
<i>Gallinula chloropus</i>								C	X	X			PPM	R	-
<i>Fulica atra</i>											X		PPM	R	-
<i>Neotis nuba</i>	X	X	X	X	X	X	X	X		X	X	X	RSS	F	-

	J	F	M	A	M	J	J	A	S	O	N	D	1	2	3
Charadrius dubius									X				PPM	R	-
Tringa ochropus	X							X	X				PPM	O	-
Tringa hypoleucos								X					PPM	R	-
Calidris minuta									X	X	X		PPM	O	-
Philomachus pugnax							X	X	X				PPM	O	-
Cursorius cursor	X	X	X	X			X	X	X	X	X		RSS	F	?
Pterocles senegallus				X	X	X	X	X	X				RSS	F	+
Pterocles lichtensteinii	X	X	X	X	X		X	X	X	X	X		RSM	F	+
Pterocles coronatus	X	X	X	X	X		X			X	X		RSS/RSM	O	?
Columba livia	X	X	X	X	X	X	X	X	X	X	X	X	RSM	C	+
Streptopelia turtur		X	X	X	X		X						PPM	F	-
Streptopelia decipiens		X	X	X	X	X	X	X	X	X	X	X	RSS/RS	C	+
Streptopelia roseogrisea	X	X	X	X	X	X	X						RS	F	+
Streptopelia senegalensis	X	X	X	X	X	X	X	X	X	X	X	X	RS/RSS	C	+
Oena capensis	X	X	X	X	X	X	X	X	X	X		X	RS/RSS	F	?
Clamator glandarius				X					X				PPM	R	-
Clamator jacobinus			X	X	X	X	X	X	X				ALD	F	+
Cuculus canorus							X						PPM	R	-
Tyto alba		X	X										RS/ALM	R	-
Otus scops									C				PPM/POM	R	-
Otus leucotis		X	X	X			X	X					RSS	O	?
Bubo bubo		X				X	X						RSM	R	+
Bubo africanus			X										RS/ALM	R	-
Caprimulgus climacurus						X	X	X	X	X			ALM/ALD	O	?
Apus apus			X	X			X	X					PPM	O	-
Apus pallidus				X		X	X	X	X	X	X		PBV	F	+
Cypsiurus parvus				X		X	X	X					RS/ALM	O	?
Colius macrourus	X	X	X	X	X	X	X	X	X	X	X	X	RS	C	+
Merops apiaster				X	X								PPM	R	-
Merops orientalis	X	X	X	X	X	X	X	X	X	X	X	X	RS	C	+
Merops albicollis						X	X	X	X				ALD	O	?
Coracias garrulus							X						PPM	R	-
Coracias abyssinicus						X	X						ALM	R	?
Upupa epops	X	X	X	X	X	X	X	X	X	X	X	X	RS/PPM	C	+
Lybius vielloti	X	X	X	X	X	X	X	X	X	X	X	X	RS	C	+
Pogoniulus chrysoconus	X	X	X	X	X	X	X	X	X	X	X	X	RS	F	+
Trachyphonus margaritatus	X	X	X	X	X	X	X	X	X	X	X	X	RS	F	+
Jynx torquilla									X				PPM	R	-
Dendropicos elachus	X	X	X	X	X								RS	O	?
Mesopicos goertae	X	X	X	X	X	X	X	X	X	X	X	X	RS	C	+
Alaemon alaudipes	X	X	X	X	X	X	X		X	X	X		RSS	C	+
Ammomanes cincturus	X	X	X	X	X	X	X	X		X	X		RSS	F	?
Ammomanes deserti	X	X	X	X	X	X	X	X	X	X	X	X	RSS/RSM	C	+
Calandrella cinerea	X		X	X									POM	F	-
Eromopterix nigriceps			X	X	X	X	X	X	X				ALM	F	+
Galerida cristata		X	X				X						ALM	O	-
Riparia riparia				X	X	X		X					PPM	O	-
Hirundo rustica		X	X	X	X	X		X	X	X	X		PPM	C	-
Hirundo obsoleta	X	X	X	X	X	X	X	X	X	X	X	X	RSM	C	+
Delichon urbica			X	X	X	X							PPM	O	-
Motacilla flava	X	X	X	X	X		X	X	X	X	X		PPM	F	-
Motacilla alba	X	X	X	X			X	X	X	X	X		POM	F	-
Anthus campestris			X	X	X								PPM	R	-
Anthus trivialis								X	X				PPM	R	-

[illegible]