

## Azraq — A Case Study

### Introduction

My contribution falls into three clearly defined sections. First I want to present a picture of the Azraq area, with its wildlife. Then I want to discuss some of the difficulties, which exist on a global scale, facing conservation of wildlife areas, and finally, I will try to meet some of Azraq's own problems. The reason why I do not move straight from the description of Azraq to its problems, is because the underlying causes of its difficulties are not purely under Jordanian control. Azraq can be used as a particular case, exemplifying general problems. There is no country in the world without conservation problems.

### The Azraq area

The centre of the Azraq area, in importance, is the series of clear, deep pools, about 9,000 m.<sup>2</sup>, filled by upwelling water which has travelled beneath the basalt cap and which emerges where the basalt peters out and the underlying limestone comes to the surface. You must not imagine that these pools are fed by a trickle. Before pumping to the town of Irbid began in September 1963 the discharge from the Druze (Azraq North) pools was around 2 million gl./day. From the pools of Azraq South, something like 6 million gl./day emerge and most of it flows into the central and more or less permanent marsh, which occupies about 7 km.<sup>2</sup> and contains extensive stands of reeds (*Typha angustata* and *Arundo donax*). Another 18 or 19 km.<sup>2</sup> of shallow lagoons, creeks and water meadows contain rushes, sedges, grasses, tamarix and other vegetation.

The beauty and richness of these wetlands and surrounding areas is hard to imagine for those who have never seen them. I do not wish to use space with a long list of all the birds and the few mammals that occur there. These are fully detailed in Nelson (1973) and I need only mention a few here. Seventy three species of birds breed, or almost certainly have bred, in the Azraq area (Appendix 1) whilst more than 400 species have been recorded there.

The breeding species fall into the desert-adapted groups and the wetland birds. The migrants, which make Azraq one of the most exciting places in the world for the bird-watcher,

result from the geographical location of Azraq at the cross-roads of a vast flood of Palaearctic migrants moving, in spring, from south of the Sahara to Europe and Eurasia, and back in autumn. The stork and raptore migration is one of the great phenomena of nature. Azraq's wetlands attract huge numbers of individuals and species, particularly of passerines and waders, from the sky, where they are passing overhead largely unseen. As an ornithological site, a stop-over on a major migration route, Azraq's importance can hardly be overstated.

The desert-adapted species include no fewer than nine larks ideal for ecological study. This group contains, amongst others, the intriguing thick-billed lark, Temminck's horned lark and the hoopoe lark. The desert lark occurs in different colours according to its background and manages to survive even in the blistering heat of the basalt desert. The large wadi spreads are particularly good for larks, and six species may occur within a few hundred metres.

The open hammada is inhabited by cream coloured coursers, sand grouse, houbara bustards and stone curlews, and should also support ostriches. The wadis, which have more vegetation, support common, isabelline and red-rumped wheatears, Sardinian warblers, great grey shrikes and other commoner species such as streaked scrub warblers. Among basalt desert one may find the lovely pink trumpeter finch.

As one approaches the wetland fringes, the edges of the qua are frequented for breeding by some lovely waders, among them avocets, stilts, spur-winged plovers, pratincoles, Kentish plovers and sand plovers.

Within the wetland proper is a miniature aquatic jungle with breeding marsh harriers, purple herons, squacco herons, lesser bitterns, water rails, Baillon's and spotted crakes, and five species of acrocephaline warblers (reed warblers and their relatives). On the small islands which occur throughout the marsh may be found blue-cheeked bee-eaters and rufous bush-chats.

In winter many species of duck (17 species recorded) rest and feed on the flooded qua and in the marsh. The wildfowl population appears to have declined markedly in recent years although the shooting may not be the main cause.



As for the third group, the migrants, there is little to equal the thrill of finding the rare and unexpected among the flood of species pouring through this vital staging post. Among the more bizarre visitors one may instance cormorants, pelicans, flamingoes, swans, geese, 11 species of gulls and terns, three species of kingfishers, and of course cranes, and many species of wildfowl. The observer may witness vast through-flows of hirundines, warblers, raptors, waders, wagtails, pipits, flycatchers, shrikes, wheatears and many more. Although the birds are the most varied and numerous vertebrates around Azraq, there are many reptiles and herpetology is a much neglected component of Azraq's natural history. The reptilian fauna include more than a dozen lizards, several geckos, skinks and probably at least 10 snake species.

Mammals are less in evidence, but include several interesting carnivores (striped hyaena, jackals, wolves, foxes, perhaps sand-cats) though the predatory large cats (lion, cheetah, leopard) are long since extinct. The rodents are an especially interesting group which includes jerboas, gerbils and sand-rats, with fascinating adaptations to desert life, worthy of in-depth research.

That brief and selective account of Azraq's wildlife is all that I have time for. It doesn't even mention the invertebrates which abound within the oasis, nor the fishes, nor the diverse vegetation. As I said, I merely wish to show that Azraq is a unique wetland within a badia or semi-desert area of great interest and diversity.

I must now sketch, again far too briefly, the global problems which are at one and the same time making National Parks vitally important and yet difficult to create and maintain. These problems are part of Azraq's difficulties too.

The background, against which countries throughout the world are attempting to set aside areas within which the special and distinguishing features of their landscape, wildlife and cultural heritage can be safeguarded, is a sombre one. It can be summed up in a sentence: the accelerating destruction, on a global scale, of major habitat-types and their inhabitants by various forms of exploitation. This comes about through:

*Utilisation of resources* (minerals and vegetation, especially native timber), which devastates huge regions (Amazonia, Canada, Malaysia, Australia, New Zealand, etc.) or exploitation of fauna (e.g. whales, fishes, herbivores).

*Agricultural practices* (draining, felling, clearing, burning, grazing, use of pesticides, herbicides and fertilisers). In many countries farming practices are the major cause of habitat destruction and decline in the diversity of wildlife.

*Concomitants of industry* (roads, buildings, reservoirs, power stations and power-schemes, pollution, etc.).

Another major background factor germane to habitat destruction is the progressive urbanisation of world society. One result of this is a shift in values, towards increased consumerism, with all its socio-political effects. Increased consumerism

generates industrialisation and economic growth, with the results noted above. The ramifications of this global urbanisation are of immense and over-riding importance. Amongst its effects is the destruction of indigenous cultures (Aboriginals, Indians, Amazonians, Maoris, Eskimos, Pygmies and, of interest to this Conference, Bedouins).

Finally, and underlying both the utilisation of resources and the urbanisation trend, is the increase in world population, the single most threatening factor on earth so far as the preservation of other forms of wildlife, of cultures, and of habitat, is concerned.

The problems of any single country, with regard to wildlife and habitat, can be viewed only in relation to these wider phenomena. Today, no country is isolated. The way in which a country treats its resources relates directly to population pressure, economic pressure, politics, foreign aid and so on, and these, as we all know, are interconnected throughout the world, so that, to modify a famous dictum, when Sheik Yamani sneezes the whole world catches a cold.

It is obvious that there are irreconcilable conflicts of interest in the way a country's resources are to be used and we have to face the fact that the cards are heavily stacked against conservation and the preservation of habitat and wildlife. Population pressure and the acquisitive, competitive aspects of man's nature are the fundamental realities that underlie this conflict.

We could spend all our time pondering the forces which have been and are responsible for the devastation of this earth, but now, for the third part, we turn specifically to Azraq as a case study. I have indicated what is present there; now we must look at what has been done, and what can be done, with this magnificent area.

Azraq has beauty, history, wildlife, recreational and research potential—five important assets. Azraq has suffered heavily, especially this century, and particularly in the latter half. The destructive forces which I listed a minute ago and which, as we know, have been operating all over the world, have greatly affected Azraq and indeed the Azraq drama enacts, in miniature, the global one. The area has been degraded by removal of vegetation, overgrazing, destruction of indigenous wildlife, removal and pollution of water, road building and traffic, military and sporting pressures. The way of life of the indigenous culture, the Bedouin, from whom the Hashemite Dynasty springs, is rapidly succumbing to the pressures of politics and modernisation. Despite the fact that in Roman times the Azraq area was more densely populated than now, human pressure has increased dramatically and is now intense, with military, commercial, recreational, shooting and farming pressures all playing a part.

What is to be done? Logically, I should follow the pattern used earlier, and deal first with global solutions and then with Azraq. But apart from the fact that the solutions are totally beyond me, I have no time even to explore the possibilities. I would however, make one or two generalisations, not new ones, but vitally important. Continuous economic growth is a



nonsense because it is incompatible with limited resources and with the prevention of pollution. An equilibrium economy, indefinitely sustainable, should be the goal. Non-renewable resources should be used sparingly. From renewable resources, such as most vegetation, and wild fish, bird and mammal stocks, sustainable cropping should be enforced. We should remove from the stocks only as much as they can withstand without long-term reduction.

But to return to Azraq. The ideal of a great Desert National Park which His Majesty King Hussein approved in 1966 has, sadly, never been realised. Important national and international interests have had to be considered in the decisions about what to allow and what to forbid at Azraq and the result, perhaps inevitably, has been that the concept of a large Desert National Park, with research into arid-zone life sciences included, has had to sink. So there is not, and never has been, such a park in any meaningful sense, and there is not, and never has been, an appropriate Scientific Research Programme to support and underpin Park Management. In stating these facts I do not wish to criticise, but merely to record.

However, there now is a Desert Reserve at Shaumari and an Azraq Wetland Reserve. Both of these could be of enormous benefit and importance to Jordan, as I hope to show. Both these Reserves are under the management of the Royal Society for the Conservation of Nature, Jordan, which had, in 1967, already formulated an ambitious programme to protect the surviving fauna and re-establish some of the species which had become extinct, or nearly extinct. Although, in Jordan, the Ministry of Agriculture is responsible for Conservation of Nature and Natural Resources, there is no government department for Wildlife Affairs and this function rests with the RSCN.

The Azraq Desert (or Badia) Reserve is planned to embrace 600 km.<sup>2</sup> of which, however, only a small part (22 km.<sup>2</sup>) at Shaumari—the Shaumari Wildlife Reserve—is already designated and protected. This will soon be extended to cover 330 km.<sup>2</sup>. Shaumari lies about 118 km. SE of Amman by road at 31°50'N, 36°40'E. I described it as the greatest asset that the Desert Research Station, which I tried to initiate in 1968/69, could have (Nelson, 1973). Later, Phoenix Zoo, where the World Herd of Arabian Oryx is located, described Shaumari as 'nearly ideal' for re-establishing oryx in the wild. With World Wildlife Fund backing, a project to establish breeding quarters for gazelles, oryx and possibly other species, was started at Shaumari in 1975 and the area has been brought up to full reserve status, fulfilling all the requirements for inclusion in the UN List of National Parks and Equivalent Reserves (Clarke, 1977). The breeding quarters comprise five herd enclosures, ten isolation pens and a large food store. They are protected by predator-proof mesh fence and fed by an underground water system. The whole of the Shaumari Reserve is fenced against browsing by domestic animals and the rich vegetation (more than 170 plant species) is a striking demonstration of what Badia can become when not over-

grazed, and what large areas around Azraq used to be. Shaumari Reserve now contains, as I myself saw, 30 oryx and 15 Arabian gazelles. These are wandering freely within the reserve and there seems every prospect of building up sufficient numbers for eventual release outside. The breeding pens contain a pair of onagers and a single female ostrich whose mate was recently killed by a snake (*Cerastes*). It is planned to replace him.

The second Reserve to be declared within the area which was to have been the National Park, is the Azraq Wetland Reserve, formally handed over to the RSCN in 1977. It is vitally important and includes 13 km.<sup>2</sup> of marsh and quedge. In addition to the marsh the Government designated, under the Ramsar Wetland Convention, a further 86 km.<sup>2</sup> of mudflat edge as part of the wetland which is of special importance as a waterfowl habitat. Some of the marsh had already been fenced in more than 3 years ago (Conder, 1980) but the boundary fence is still incomplete. Observation hides (blinds) and nature trails are planned. At present, this area, the heart of the great Azraq Oasis, is still under too much pressure. In winter 1979 it was grossly overshot, with too many hunters shooting in all corners of the Reserve on what were officially non-shooting days. Many species which were not legitimate game were either shot or disturbed up to five days of the week, and shooting is allowed until March 31st, which is too long. The position has improved since, and the RSCN is slowly gaining the co-operation of the locals in complying with regulations.

Because of the highway which now goes right through Azraq, the Reserve area is also heavily used for recreation, with consequent litter (in vast and disfiguring amounts) and some pollution of the water, especially from car-oil. The adjacent village (Azraq South) is growing rapidly, and water wells are proliferating. A new air base and camp has been established in the area and draws its water from the same aquifer system. South Azraq water has, on several occasions, been pumped to Amman and at least once, the overflow to the marsh completely ceased until pumping was stopped by emergency action of the RSCN. All this is in addition to the water which is pumped from the pools at Azraq North, to Irbid in North Jordan. It cannot be said too often that if too much water is taken from Azraq and the marsh dries up, the oasis will die.

These, then, are the two reserves already designated in the Azraq area, and, in essence, they are the modified descendants of the originally-proposed Desert National Park which now has no real chance of establishment. It is clear that the Greater Azraq area is destined to be used in several different ways and the problem is to achieve harmony between them and conservation needs. That, in fact, is the problem in most of the National Parks of the world. Leaving aside the obvious need for an adequate ranger service and protection from blatant exploitation through excessive shooting and disturbance, the two reserves, in my opinion, offer their greatest potential in the fields of research and training.



### 1. Shaumari reserve

Based at Shaumari, Azraq could become a great national and international centre for Desert Research. I was convinced of this in 1968/69 and with recent developments and facilities (accommodation at Azraq and laboratory and other facilities at Shaumari) I am even more convinced now. Simply to list the possibilities opens up prospects of decades of productive work.

Shaumari offers facilities for extensive research into:

- 1) The ecology, behaviour and physiology of desert adapted mammals especially oryx and gazelles. Many countries could benefit from rearing and culling animals best adapted to conditions there, instead of rearing introduced, domesticated herbivores.
- 2) The ecology and physiology of desert-adapted vegetation; its nutritive value (in relation to herbivores such as the gazelle and oryx); regeneration; uses (fuel; extracts; forage) and plant breeding experiments.
- 3) Desert microclimatology and soil studies.
- 4) Irrigation techniques.
- 5) Insect ecology and physiology.
- 6) Ecology and behaviour of desert-adapted birds—the sympatric larks are an obvious group. Areas of current theoretical interest include communal breeding and optimal foraging techniques.

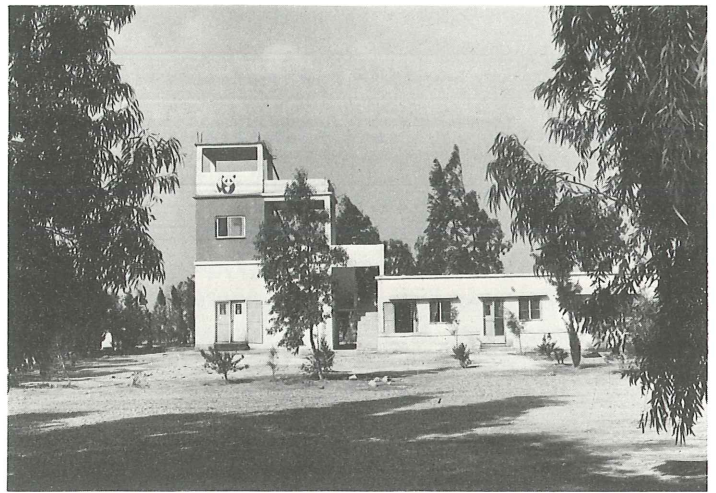
Such a research programme need not exclude visitors. Shaumari is enormously attractive to migrant birds, and therefore to ornithologists, and an animal breeding programme would be an attraction for visitors. It would not be difficult to ensure that visits did not conflict with research and breeding work. This use of Shaumari seems to me to be eminently practicable. It can grow gradually without a massive initial outlay; it can be geared to Jordan's internal needs by tackling relevant research problems, some of them of an applied nature; it can absorb some of her best graduates and it can strengthen her links with other Arab countries and their conservation programmes by offering training in techniques—for example of the estimation of abundance of plants and animals and of animal breeding.

There is, however, an essential prerequisite. First, there must be a convincing prospectus for research to get a programme started. Research then begets more research. I urged this in 1968/69 and the obvious driving and directing forces are the University of Jordan and Yarmuk University. It does seem that the Universities have not placed research at Azraq high on their priority lists.

To initiate research, a realistic first step would be the production of a detailed Research Opportunities publication with a list of potential research topics, a description of existing facilities, names and research interests of existing supervisors at the University (or in government departments) and where appropriate, approximate costings.

This publication should be compiled by University staff

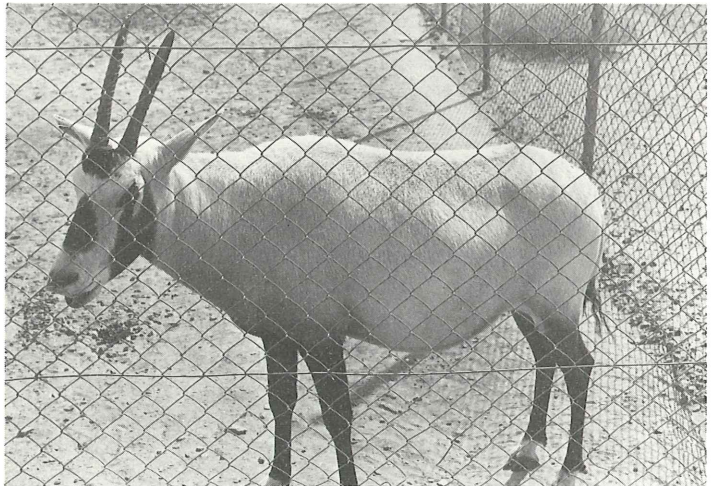
1. The Headquarters and Laboratory at Shaumari.



2. Part of the gazelle and oryx breeding area at Shaumari.



3. Shaumari bred oryx.



from appropriate departments—mainly the Biological Sciences—and sent to the world's reputable Universities and appropriate Research Institutes. If, for specific projects, supervision from within Jordan is not available, then this should be stated. Other research areas, such as the Galapagos and the



famous Serengeti (Serenera) Research Centre do not necessarily provide internal supervisors. The cost of printing and distributing Research Opportunities pamphlets would be money well spent if it brought in a nucleus of postgraduates, with their own research grants from outside Jordan. Once off the ground, a thriving Research Centre could develop.

As the recession in the west continues, research money is becoming scarcer. In Jordan, with more problems than many countries, it may be even more difficult to fund research which may not have immediate practical application. Ph.D students from abroad are therefore especially valuable and the two Universities in Jordan have the key role in attracting them.

## 2. Azraq wetland reserve

Although there is plenty of scope for research here, I think this Reserve would be ideal for nature-oriented recreation. It has beauty, peace and abundant and colourful wildlife. The problems of overshooting, disturbance and despoilation which it faces are far from insuperable, provided the water does not shrink through over-use. Education, through display (interpretative) centres and the media and an adequate ranger service would help greatly.

At present, one must admit that visiting bird-watchers would come in the main from outside Jordan, but this is not a bad thing. It makes Azraq famous, and brings revenue to Jordan. As in the Galapagos, there could be adequate access for observation, photography, etc. without unacceptable disturbance, provided that the flow of visitors is regulated and breeding birds adequately protected. The need for nature trails and observation blinds has been pointed out in previous publications and is treated in Conder's (1980) report. With the excellent Government Rest House now open, in addition to new, private hotels, there is plenty of accommodation for visitors.

A migration research centre of great importance could be established. Migration research topics could be defined and presented in the Research Opportunities publication. There is scope for many ecological projects in the wetland. The wintering wildfowl population deserves and would repay detailed study.

In sum, and to conclude, I would suggest:

- 1) the institutions and departments within Jordan that are concerned with wildlife and conservation should accept, as I am sure they do, that the original concept of the Greater Azraq Desert National Park cannot be realised in the foreseeable future.
- 2) that there is nevertheless a promising international rôle available for the two smaller reserves that have been established.
- 3) that this rôle centres primarily on research and selective recreation and tourism.
- 4) that to achieve these more realistic objectives requires proper publicity for the Research Opportunities and a major input from the Universities in Jordan, enhanced

efforts to inform, interest and educate the people who visit Azraq, and as a priority, adequate protection on the ground as well as in law, for the habitat and wildlife in the New Reserves.

From these sources, who knows what could develop if and when the political and economic climate ameliorates.

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## Appendix: Breeding birds of the Azraq oasis and surrounds<sup>1</sup>

Key to status:

- B = Breeds (not necessarily every year)  
 (B) = Probably breeds, but unproven  
 HB = Has bred  
 (B)\* = Possible breeder

SPECIES		STATUS
Little grebe	( <i>Podiceps ruficollis</i> )	(B)
Little bittern	( <i>Ixobrychus minutus</i> )	B
Squacco heron	( <i>Ardeola ralloides</i> )	B
Purple heron	( <i>Ardea purpurea</i> )	B
Common shelduck	( <i>Tadorna tadorna</i> )	(B)
Mallard	( <i>Anas platyrhynchos</i> )	B
Teal	( <i>Anas crecca</i> )	(B)
Pintail	( <i>Anas acuta</i> )	(B)
Garganey	( <i>Anas querquedula</i> )	(B)*
Marsh harrier	( <i>Circus aeruginosus</i> )	B
Kestrel	( <i>Falco tinnunculus</i> )	B
Chukar	( <i>Alectoris chukar</i> ) (= <i>graeca</i> )	B
Houbara bustard	( <i>Chlamydotis undulata</i> )	B
Water rail	( <i>Rallus aquaticus</i> )	B
Baillon's crane	( <i>Porzana pusilla</i> )	B
Waterhen	( <i>Gallinula chloropus</i> )	B
Coot	( <i>Fulica atra</i> )	(B)
Kentish plover	( <i>Charadrius alexandrinus</i> )	B
Little ringed plover	( <i>Charadrius dubius</i> )	(B)
Greater sand plover	( <i>Charadrius leschenauftii</i> )	B
White-tailed plover	( <i>Vanellus leucurus</i> )	(B)
Spur-winged plover	( <i>Vanellus spinosus</i> )	B
Black-winged stilt	( <i>Himantopus himantopus</i> )	B
Avocet	( <i>Recurvirostra avosetta</i> )	B
Stone curlew	( <i>Burhinus oedienemus</i> )	B
Cream-coloured courser	( <i>Cursorius cursor</i> )	B
Pratincole	( <i>Glareola pratincola</i> )	B
Black-bellied sandgrouse	( <i>Pterocles orientalis</i> )	B
Pin-tailed sandgrouse	( <i>Pterocles alcata</i> )	B
Spotted sandgrouse	( <i>Pterocles senegallus</i> )	(B)

<sup>1</sup>Nelson, J. B. 1973. *Azraq: Desert Oasis*. London: Allen Lane.

Clarke, J. E. 1980. 'The avifauna of Shaumari Wildlife Reserve, Jordan.' *Sandgrouse*, vol. 1, pp. 50–70.

SPECIES		STATUS	SPECIES		STATUS
Rock dove	( <i>Columba livia</i> )	B	Moustached warbler	( <i>Acrocephalus melanopogon</i> )	B
Little Owl	( <i>Athene noctua</i> )	B	Sedge warbler	( <i>Acrocephalus schoenobaenus</i> )	(B)
Egyptian nightjar	( <i>Caprimulgus aegyptius</i> )	B	Marsh warbler	( <i>Acrocephalus palustris</i> )	(B)
Bee-eater	( <i>Merops apiaster</i> )	(B)	Reed warbler	( <i>Acrocephalus scirpaceus</i> )	B
Blue-cheeked bee-eater	( <i>Merops superciliosus</i> )	B	Clamorous reed warbler	( <i>Acrocephalus stentoreus</i> )	(B)
Sand martin	( <i>Riparia riparia</i> )	(B)	Great reed warbler	( <i>Acrocephalus arundinaceus</i> )	B
Dunn's lark	( <i>Eremalauda dunnii</i> )	B	Sardinian warbler	( <i>Sylvia melanocephala</i> )	(B)*
Desert lark	( <i>Ammomanes deserti</i> )	B	Graceful warbler	( <i>Primia gracilis</i> )	B
Bar-tailed desert lark	( <i>Ammomanes cincturus</i> )	B	Streaked scrub warbler	( <i>Scotocerea inquieta</i> )	B
Hoopoe lark	( <i>Alaemon alaudipes</i> )	B	Fan-tailed warbler	( <i>Cisticola juncidis</i> )	B
Short-toed lark	( <i>Calandrella cinerea</i> )	B	Black-eared wheatear	( <i>Oenanthe hispanica</i> )	(B)
Lesser short-toed lark	( <i>Calandrella rufescens</i> )	B	Mourning wheatear	( <i>Oenanthe lugens</i> )	(B)
Thick-billed lark	( <i>Rhamphocorys clot-bey</i> )	B	Strickland's wheatear	( <i>Oenanthe opistholeuca</i> )	(B)*
Temminck's horned lark	( <i>Eremophila bilopha</i> )	B	Desert wheatear	( <i>Oenanthe deserti</i> )	B
Crested lark	( <i>Galerida cristata</i> )	B	Red-rumped wheatear	( <i>Oenanthe moesta</i> )	(B)
Tawny pipit	( <i>Anthus campestris</i> )	(B)	Isabelline wheatear	( <i>Oenanthe isabellina</i> )	(B)*
Yellow wagtail	( <i>Motacilla flava</i> )	B	Rufous bush-chat	( <i>Cercotrichas galactotes</i> )	B
Great grey strike	( <i>Lanius excubitor</i> )	B	House sparrow	( <i>Passer domestica</i> )	B
Raven	( <i>Corvus corax</i> )	B	Pale rock sparrow	( <i>Petronia brachydactyla</i> )	(B)
Brown-necked raven	( <i>Corvus ruficollis</i> )	B	Goldfinch	( <i>Carduelis carduelis</i> )	(B)
Savi's warbler	( <i>Locustella luscinioides</i> )	(B)*	Trumpeter finch	( <i>Rhodopechys githaginea</i> )	(B)