

ON BIOLOGY OF HOUBARA BUSTARD (*CHLAMYDOTIS UNDULATA*
MACQUEENII) IN BALOCHISTAN, PAKISTAN: SOME FIELD
OBSERVATIONS ON BEHAVIOUR

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Abstract: Field observations on behaviour of Houbara wintering in Balochistan (Pakistan) suggest that though it becomes alert to the approaching man or jeep from a distance of some 500 m, yet it allows their approach up to some 50 m. The reaction to such stimuli varies with type, mode of application, recent experience, physiological and psychological state of individual bird, size of the flock and general foraging conditions. Different body postures indicate different psychological states of individuals. The bird comes in open place and takes few brisk steps before taking to its wings. Distance maintained from the human settlement directly increases with the size of settlement. The bird retires from active foraging during the middle part of the day but does not go for a complete rest. Houbara selects an open place between shrubs for night roosting, where it maintains an alert sitting posture and keeps on changing the roosting places during the night. The species prefers to stay on ground during dust storm. It can more efficiently avert falcon attack while on ground. It has a perfect camouflaging, especially when it is still or squatting.

Key words: Interference, falcon, storm, human settlements, rest, camouflage.

INTRODUCTION

Knowing behavioural responses and needs help in understanding the basic biological requirements of an animal species. This knowledge can be exploited in development of future experimentation, conservation strategy and planned hunting programmes (Ralls, 1995). Researches and observations on behaviour in bustards (*Ardeotis australis*: Fitzherbert, 1979; *Tetrax tetrax*: Schulz, 1985; *Eupodotis melanogaster*: Schulz and Schulz, 1986; *Otis tarda*: Hellmich, 1987; *Choriotis nigriceps*: Ali and Rahmani, 1982; Manakadan, 1985) and/or Houbara Bustard (Collins, 1985) have been generally overshadowed by records on habitat, migration, food and population as per practical problems associated with behavioural study on desert species in the wild (Launay and Paillat, 1990).

Present study was instituted with the hope that field observations, gathered from different parts of wintering range of Houbara in Balochistan, will allow us to reach at

some broad preliminary generalisations on general behaviour, which can be used in management programmes designed for the species.

MATERIALS AND METHODS

Field observations were recorded on selected bird/birds, in different localities of Balochistan (Pakistan), regarding their general behaviour and reaction of adult Houbara to different stimuli, as and when allowed by suitability of conditions. After spotting bird/birds in a general broad locality, some suitable observation point was carefully selected without disturbing the bird. A man, group of men or a jeep was asked to approach the bird cautiously, trying not to disturb it. Observation on reaction of the bird was recorded through unaided eyes and/or field binoculars (8 X 40, field 6.5; Enbecco, Concord) till the bird remained within the visual approach. Activity of the bird was also later traced through foot prints, wherever possible. Sudden movements and/or high pitched sounds (horns, gun fires, etc.) were avoided so as not to cause severe disturbance in the general area.

Reaction to dust storm was recorded through direct observations on selected birds, spotted when dust storm was on in the central highlands, with mid day temperature touching freezing points. Bird/birds were observed in their normal behaviour and after disturbing it by approaching man and jeep.

Reaction of Houbara to attacking falcon was recorded while we had a chance sharing of the general area with a falconry party in central lowlands.

Records were maintained on distance of each of the sighted bird/flock from the nearest human settlement, using speedometer of the jeep and a general guess, along with information on size and type of the settlement. Observations, thus collected, were organised to develop generalisations on the influence of size of settlement on Houbara.

For studies on night roosting/day time rest, the birds were spotted in an area in the evening and/or in the morning, when their active foraging activities started subsiding. Day time activities of birds were followed through general physical observations, with unaided eyes and/or available binoculars (8 X 40). Foot tracks were also traced to collect supporting information. Places of night roosting and day time rest were located through physically observing the roosting/resting bird or through foot tracks or marks of the sitting bird/birds. Observations were recorded on posture and activity level of bird and the physico-biotic conditions in/around roosting/day time rest sites.

RESULTS

Interference

Human

Two men walking through a dried water-course, with a good vegetative cover, remained unnoticed to a male Houbara coming from nearby hilly undulates (in Rakshan valley, Punjgur) for the evening foraging. It noticed the presence of the men only when

they were at a distance of some 100 m. At this stage, the bird started moving away from the approaching men, keeping its neck outstretched and low, trying to take the advantage of the edges of the water course and associated vegetation. The bird moved out of the water course when the approaching men remained at a distance of some 30-40 m. At this stage approaching men spotted the bird, when they got excited and showed some abrupt movements, making the bird to fly away.

At another occasion, a flock of four birds in Grashia valley (central Khuzdar), having relatively flat plain and evenly distributed shrubs (0.3-0.6 m height; general cover 3.13%), was tried to be approached by a group of three men. Houbara noticed the approaching men from some 300 m. All the birds (scattered with a distance of some 20-30 m from one another) immediately started moving away from the stimulus, maintaining a casual gait and relaxed posture but keeping at unconcerned eye on the men. Speed and concern of the birds gradually increased as the men got closer. Birds took to their wings when the men were at a distance of 50-70 m, and settled after taking a low flight of about 500 m. In an attempt to approach this flock a second time the birds showed more concern. This time these took to their wings when the men were still some 200-250 m away, and took a longer flight to get out of the range of the available binoculars.

In Sibi, where a flock of 9 birds persisted in cultivated fields (being exploited regularly by this flock for night foraging) despite the presence of the farmers (engaged in their routine activities). Two men tried to approach the birds through dried natural vegetation. Birds noticed the approaching men and became vigilant; but did not show an appreciable change in their activities. The birds tried to maintain a distance of 100-400 m from the men by walking and/or taking short flights. The birds persisted in the cultivations despite repeated disturbance/change for more than an hour.

Jeep

General vegetation: A single bird when approached with a jeep (CJ 7; blue with black canvas top) in Gat (western Chagai; having an almost pure stand of shrubs of *Anabasis* sp.) got vigilant to the jeep from a distance 500 m, yet remained calm and unconcerned. It, however, kept casually walking ahead of the jeep, exploiting relatively better vegetative cover in the water course. When the bird was approached to a distance of about 50 m, it walked out of the water course into a comparatively open plain, took a few brisk steps, became air borne and went out of the available vision.

In Dasht-e-Kani (Turbat), a bird initially allowed the approach of jeep (green, hard top) up to some 200 m, remaining almost unconcerned. On a closer approach the bird started moving away. It walked for some 30 m with its out stretched but low neck and took to its wings. The bird settled after some 500 m. In an attempt to chase the bird a second time, it immediately became air borne, settled at some 1.5 km and lost in the dunes.

A pair of birds was spotted in Hab (Lasbella) while grazing at a distance of some 4-10 m from each other, mainly in the bare area having a background of grey stones and some sprouting herbs. The birds allowed the approach of the jeep to a distance of about 500 m, when they started moving in front of the gradually approaching jeep. The birds walked majestically with upright neck appearing almost unconcerned to the stimulus, though with watchful eyes and moving the head in low jerks. The pair continued

moving, side by side for a distance of some 300 m, without seeking refuge. On persistence of the chase, one of the birds took to its wings, while the other continued walking rather briskly with some degree of outstretched neck and took shelter in a small shrub (0.4 m). On a closer approach, the bird opted flight and settled at the distance of some 400 m and started walking briskly, showing concern. The bird was again chased when it allowed the approach to a distance of about 700 m, resorted to flight and was lost. The bird remained watchful of the jeep throughout this period. The other bird, still hiding itself in the shrub, was tried to be approached. On seeing the jeep at a distance of some 500 m, the bird took to its wings. It settled after taking a long flight and was lost in the undulates.

A flock of 6 birds in Grashia valley (central Khuzdar, a flat plain) allowed the approach of a jeep (Suzuki, Green hard top) to a distance of 50-100 m, though the birds were vigilant from a distance of about 500 m.

A pair of birds (in Gat, western Chagai) took to their wings when the jeep was still at a distance of about 300-400 m and disappeared. It could not be adequately confirmed whether this pair had already faced a chase, though a vehicle with hunters was later spotted in the area.

At two other occasions (in Sibi), Houbara was spotted in the general vegetation. On seeing the approaching jeep from a distance of 1 km the birds took to their wings and settled after a flight of about 1 km. The birds were lost in the general vegetation, after an identical reaction on the second chase.

Cultivations: In Sibi, a flock of 9 birds tried to maintain a distance of 500-700 m from the jeep, while on their evening foraging in the cultivations, being regularly exploited for night foraging. At one occasion, jeep happened to come close to the flock (50 m) and caught the birds in a surprise. At this stage the birds became chaotic, immediately took to their wings and even moved towards the jeep. On noticing the jeep under them, the birds suddenly changed the direction of their flight in an attempt to find a safer distance. On a second chase, birds became alert from a distance of 300 m, but took to their wings when these were some 50 m away and settled after some 50 m. These were again chased when these became air borne from a distance of about 100 m; and settled after a flight of some 100 m. The birds when chased a fourth time, took to their wings from some 300 m and settled after a flight of about 100 m, when these disappeared taking advantage of a scanty shrub cover.

At another occasion, the birds spotted in the fallow land cultivation (not used as regular foraging grounds), allowed the approach of jeep up to 200 m, when these started walking in front of the jeep. These birds tried to maintain a distance of 200-300 m. The birds took to their wings after walking for more than 1 km and settled after about 500 m.

A single bird present in a cultivated field (Kodalip, Khuzdar) maintained a safe distance from the approaching jeep. The bird avoided to take to its wings and tried to adjust its position in the field maintaining a distance of 200-300 m from the jeep, giving an impression that it cannot fly. However, when the chase persisted for some 15 minutes, the bird took a longer flight (1 km) and was lost in low undulates.

A lone female was present in a cultivated field (Kodalip, Khuzdar) where the wheat had just started sprouting. The bird remained almost unconcerned to the approaching jeep till it was some 400 m away. The bird then started moving briskly away from jeep to take shelter in a *Rhazya stricta* bush (0.2 m tall) and remained undetected to the workers in the jeep. The bird moved in the centre of the field when the jeep reached close to the bush (50 m). It continued walking briskly, showing cautious attitude, but did not opt to fly. On persistence of the chase the bird took a short flight and settled at about 100 m, in the distal part of the field. On a further chase, the bird took to its wings when the jeep was still some 200 m away, and settled after some 500 m on the other side of the hilly undulate. This bird remained in the cover of general vegetation, feeling itself safe from the approaching jeep till it reached a distance of some 50 m. At this stage, it moved around the bush (*Astragalus hyrcanus*), remaining undetected by the occupants of the jeep. When the bird was spotted, the jeep stopped suddenly in excitement of the occupants. It caused the bird to resort to flight and settle after taking a much longer flight with Houbara standards (about 2 km).

Dust storm

A pair of birds was spotted at about 11:30 a.m. in western Chagai, having a sparse vegetation in comparatively open area and a better cover in a dried water course with a gentle edges. A very low temperature (almost freezing) was prevailing and strong dust storm was on. The birds persisted around *Anabasis* sp. bushes. When the birds were disturbed by a directly approaching jeep, they moved out of the bushes into the open area. The male attempted flight, but almost immediately grounded itself. The bird went back into the water course, crossed it diagonally and settled in the side of one of the bushes. On persistence of the chase, the bird once again tried to become air borne; but decided against and found refuge in an other bush of *Anabasis* sp. (0.3 m high: 0.35 m diameter). The female was lost during this process and could not be studied for a similar behaviour.

A similar reaction was observed at another occasion (Kharan). The bird resorted to seek refuge in a shrub (0.1-0.2 m high) after finding itself incapable of taking to its wings.

Attacking falcon

A comparatively heavy male Houbara placed near a low bush squatted on the ground on seeing the attacking falcon. It fell flat with the head and the neck placed on the ground and slightly raised back. The tail feathers were prominent giving the appearance of a bush. The neck frill was erect. The bird remained undetected to the falcon.

At another occasion, a very heavy male was attacked by the falcon while it was on ground. The bird immediately erected its neck frill and tail feathers and started giving a tough fight, finally forcing the attacking falcon to give up. At this stage, a second falcon was allowed by the falconer, which too was finally exhausted by Houbara.

Human settlement

Houbara was generally observed at an average distance of some 2-3 km from human settlement of about 100 houses; at 3-4 km from a rather busy RCD highway in

Yakmuch; at about 1 km from a settlement of some 20-25 houses, at 750 m from a settlement of 5-10 houses. In Bisemah, the birds, however, came to a distance of 500-1,000 m from the town (about 500 houses), to forage during the night in the cultivated tracts (providing the only foraging grounds in the area). The birds retired to deeper parts of natural vegetation during the day. Occasional birds have been sometimes spotted in the vicinity of human settlements and/or busy road, especially when located in the mid of natural Houbara habitat.

Rest

Day time rest: In Patak (Punjgur), the birds moved to relative desolated hilly undulates after morning foraging, where these spent the middle parts of the day. Foot prints of some rather slow walking birds could be traced in depressions and general area; but a sitting and/or mark of a sitting bird could not be spotted, despite out hectic efforts. There was also no indication to suggest exploitation of the bush/bushes for day time rest.

In Sibi, the birds persistently retired to the dry general vegetation in the morning after night foraging in the cultivations. The birds could neither be spotted nor their day time activity be traced through foot prints in the presence of a comparatively stabilised soil.

At two occasions, the birds have been seen at about 10.00 a.m. in Kharan, walking along dried water courses moving towards desolated hilly undulates away from relatively disturbed general valley, having cultivated fields. The temperature appeared tolerable. The birds exhibited little interest in grazing and looked like moving casually. The birds persistently exploited depressions.

At about mid day, in Dasht-e-Kani (Turbat, temperature 30°C), a bird was observed walking rather casually and trying to exploit the shades of small shrubs of *Haloxylon salicornicum*. The bird though stood for some time exploiting the shade of prevalent shrubs, yet it kept on showing some movements of feet/body. Throughout the period the bird maintained an upright alert posture.

In different areas the birds persisted in the general vegetation and exhibited some degree of activity throughout the day. The level of the activity was low during the middle parts of the day. During low activity periods, the birds appeared to rest for a while along some protective bush. A low level of casual foraging continued during such periods.

Night roosting: A pair of roosting birds was spotted in the western Chagai. These birds were sitting at a distance of 2.5 m from each other in the dried water course having gentle edges. The roosting places were at a distance of 2-3 m from an *Anabasis* sp. bush (about 1 m in diameter). A bird was spotted sitting in the dried water course while roosting in Dalloh valley (Urmagai) during night. The bird selected its roosting place right in the middle of the water course having smooth edges and at a distance of 2.5 m from the nearest shrub. At two different points, Houbara was seen sitting in open tracts between 0.3-0.4 m tall shrubs in Harrah (Lasbella) valley.

The impressions of the sitting posture appearing on the loose sand suggested that the bird roost with its tarsi totally placed on the ground and bearing the total weight of

the body. Very little of the other parts of the body appeared touching the sand. Bird appeared to have remained in the upright* position. At only one occasion, the faecal pellets were seen at the roosting place.

Camouflaging

A Houbara was spotted in Rakshan valley (Punjgur) in the centre of a cultivated field (some 1.5 hectare), having sprouting wheat but giving a general aspection of a loose sandy patch. On seeing the approaching men the bird became still, maintaining an upright posture. The bird matched with the background so perfectly that it remained undetected by approaching men (experienced hunters) for a considerable time, although they were pointed towards the general location of the bird and they were sure of its presence in the field. The bird was spotted through the rising sand trails, only when it started moving.

DISCUSSION

Detailed studies on behaviour require massive inputs in the form of manpower, time and finances so that patient observations could be recorded. Such studies are more difficult on Houbara in its wintering grounds, showing extensive movements. The radio tracking could be a useful alternate but in the absence of efficient trapping techniques (Taylor, 1985; Launay *et al.*, 1996) it has a little practical value in this bustard species. Physical observations on selected birds supported by track tracing has been previously exploited in Great Indian Bustard (Ali and Rahmani, 1982; Manakadan, 1985).

Some careful behavioural studies have been instituted in recent years on captive flock (Launay and Paillat, 1990; Combreau and Launay, 1996; Jacquet and Launay, 1996), but no study is available on behavioural responses of the species under field conditions, except for some observations recorded on Canary Island race (Collins, 1985). The present study is grossly below a desired level and hence demands detailed studies; yet is the first to provide some direct field observations on this race.

On the basis of the available results, the following pattern of behavioural responses can be evolved.

Reaction to stimuli

1. Houbara moves away from the approaching stimulus or predator to find a suitable shelter *i.e.*, physical or vegetative cover. It spots the on-coming predator (man) or disturbance (jeep) from a distance of 300-500 m, when it starts taking protective measures, mainly relying upon its camouflaging armoury. However, its concern increases as the stimulus continues approaching, when it tries to find a suitable shelter. The bird takes to its wings only when it is sure that camouflaging is grossly insufficient and being air borne is safe. This is in general conformity with observations recorded in different reviews (Ali and Ripley, 1983; Cramp and Simmons, 1980).

2. Behaviour of the bird varies with recent experience and physiological state of the individual. It allows the approach of the stimulus to a closer distance (50 m) if it has not met a recent chase but flies away when the stimulus is still at a longer distance (300-400 m) if it was chased in recent past. However, on acclimatisation of the bird/birds to the

human activities, especially when these are not chase oriented, a little concern is exhibited to approaching man.

The response of the bird is more pronounced when it is alone. The intensity of response decreases as the number of the birds within visible range increases. This appears to be a group behaviour.

The severity of response also decreases while the bird is in its foraging grounds, especially where these are limited and the bird has to wait long before foraging. This appears to be a forced behaviour, where need for food dominates the protective and wary nature of the species.

3. The response of Houbara varies with the type and mode of application of the stimulus. The bird shows more concern to the chasing man than a slow moving gradually approaching jeep. Such a behaviour has been frequently reported from this area (Mian and Surahio, 1983; Mian, 1984, 1988) and has sometimes been exploited by the hunters.

The bird is less concerned about a slow moving jeep than when it stops. The stopping of the jeep probably results in a sudden change in the mode of application of the stimulus, when the reflexes of the bird go chaotic. Such a reflex action is universal in animals.

4. Different body postures indicate different psychological states of the bird. The upright and stretched neck indicate a cautious psychological state, while the outstretched but lowered neck reflects a severe concern. The relaxed posture suggests the lack of concern. These conclusions on the species behaviour have been partially reflected in previous accounts (Ali and Ripley, 1983; Cramp and Simmons, 1980) and studies (Collins, 1984; Hinz and Heiss, 1989; Launay and Paillat, 1990).

Change in the general posture, in response to strength of the stimulus, appears to have its own adaptive value for the species. A cautious bird requires to keep an eye on the activities of the on-coming stimulus. Upright neck places the eyes on a higher position, equipping the bird to better perceive the signals. Movements of the head facilitate eyes for a better perception of signals. Bird searching for a refuge can theoretically expect an attack from the stimulus (predator) and hence it has to move rapidly to a safer place. Outstretched low neck, under such conditions, can save the bird from a possible stoop on the head/neck, which can be fatal for the bird.

Flight

The bird takes a few brisk steps before being air borne. For the purpose the bird comes out of the denser shrub vegetation. This appears to be a basic requirement of this bird species, having heavy body and large wings. Open areas can save the larger wings from being entangled in the shrubs. Our studies with phytohabitat requirements of Houbara suggest that Houbara requires stretches of bare plains as part of its habitat and cannot live in thick growth of tall grasses, shrub or trees (Mian, unreported).

Human settlements

The distance maintained by Houbara from a human settlement directly increases with the increasing size of the settlement. This goes in line with many previous reports (Roberts and Savage, 1971; Surahio, 1981, 1982; Ali and Ripley, 1983; Mian and Surahio, 1983; Mian, 1984, 1988) suggesting that Houbara lives away from large human settlements though scattered nomadic camps have no influence on distribution of the species.

Rest

1. Available data suggest that the bird species does not exploit well-defined night roosting or day time resting sites. This is a general behaviour of bustards (Cramp and Simmons, 1980). The bird prefers open places for night roosting, but no roosting has been recorded in large stretches of bare plains and cultivations. This helps the bird to detect the on-coming predator (especially carnivores, like, fox, cat, jackal and/or wolf) and to take necessary protective measures. General absence of feathers and/or faecal material from the roosting sites suggests that Houbara continues changing its roosting places throughout the night. This suits the alert nature of the bird and may allow some casual foraging during night.

Present observations suggest that the bird cares a little to seek protection of the physical or vegetative obstacle against cold breeze while roosting. The race appears to prefer chill over sacrificing occlusion of its vision.

2. The sitting posture of the roosting bird suggests an alert state, similar to the one suggested previously for Houbara (Hinz and Heiss, 1989) and for Great Bustard (Hummel, 1985). This suggests that the bird remains active throughout the night. These findings go in conformity with the experiences of many hunters, suggesting that the bird is hard to be taken while asleep (Mian, 1988). Relaxed sitting posture has been suggested for captive flock (Launay and Paillat, 1990) but such a posture is still to be recorded for wild birds.

3. The activities of the bird though subsides considerably at middle part of the day, depending upon the physiological needs, available food and general temperature, yet it does not go for a complete mid day rest. It may however, retire from foraging tract to relatively desolated parts. This may be an adaptive behaviour for optimal utilisation of habitat through feeding and protective optima. There are some indications to suggest exploitation of bush/bushes for day time rest, especially where day time temperature rises to 30°C or above. This is in conformity with our previous report (Mian, 1988).

Dust storm

Houbara appears to minimise its activities and prefers to stay on ground during dust storm, especially when there is chill associated with it. This reaction appears to be equally shared by other desert birds. Hardly any bird activity can be observed under such conditions (Mian, unreported). This appears to be a protective behaviour of the birds in the highland cold deserts.

Falcon attack

A tough fight given by Houbara, especially by males, to the falcon has been previously recorded (Ali and Ripley, 1983). It appears that the bird can protect itself more efficiently while on ground as compared with that when it is in the air.

Camouflaging

A perfect camouflaging of Houbara with the desert background has been frequently quoted in literature (Cramp and Simmons, 1980). The camouflaging plumage has a special value when the bird is still. This behaviour is the first line of defence of the species.

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