

Northern Bald Ibis *Geronticus eremita* behaviour



CHRISTIANE BÖHM
Northern Bald Ibis species co-ordinator
Alpenzoo Innsbruck-Tirol
alpenzoo.boehm@tirol.com

The NBI is an ideal zoo bird: it is big, socially active and the public is attracted by this gregarious and somehow “ugly” or better special bird species. The NBI shows a distinctive behaviour which is easy to observe. In the Alpenzoo Innsbruck-Tirol a lot of behavioural studies of the NBI have been done (e.g. Ettl 1979, Pegoraro 1983, 1992, 1996, Thaler & Job 1981) and the ethogram of the NBI could be made out. A behavioural guide has been published in the 2nd Northern Bald Ibis studbook in 1999. This lightly revised version is thought as a tool for daily work with the NBI for bird keepers, as a basis for public information or pupils who have to do behavioural exercises.

I. Daily activity pattern in captivity

In captivity Northern Bald Ibises start their daily activity late compared to other species. On cold days NBI may start leaving their sleeping sites later than 9 a.m. First day activities normally comprise comfort behaviour (yawning, preening) and greetings to their partners and the other colony members. Thereafter the birds enter the ground and start foraging and feeding. The most active hours are the late morning (between 10-12 a.m.) and during the late afternoon (15-17 p.m.). During midday most of the specimens within a given colony are roosting and inactive for 1-2 hours. Cold temperatures (<10 °C), rain and snowfall generally reduce the activity.

2. Comfort behaviour

2.1. Preening

Preening constitutes a great part of the daily activity pattern. In the typical preening posture (Fig. 1a) the wings are lowered a little bit and the feathers are bristled up. Breast, back, wings, tail and toes are preened with different intensity. The bill is cleaned by wiping on branches or scratching with the toes. Preening is often finished by stretching one or both legs simultaneously with the wing (Fig. 1b).

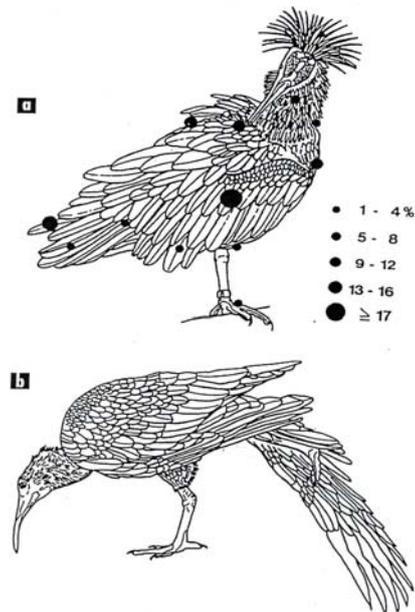


Fig. 1: comfort display of the NBI: location and preference of preening of young NBI (a); stretching behaviour (b)

2.2. Bathing

The Northern Bald Ibis loves to bath at least once a day. After entering the bathing facility the bird lowers the wings and “shovels” water over its back. At the same time it bristles up its feathers and shakes its head, back and tail alternatively. The plumage gets heavily soaked. Therefore, after bathing the bird beats its wings and spreads them out open to dry.

2.3. Sunbathing

On hot sunny days, after a longer rainy period and especially during moult the Northern Bald Ibis takes sun bathes. It shows a distinctive sunbathing exposure: while sitting on broad and flat branches the bird stays erect and opens its wings completely. The inner parts of the wings are exposed towards the sun (Fig.). The bird remains in this posture for some minutes and may start panting with its eyes closed (for details see E TTL 1979, PEGORARO 1983).

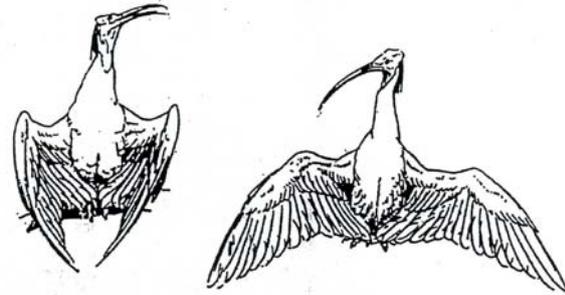


Fig: 2.: Sunbathing: the wings are open, the crest is often erect

2.4. Social preening

Social preening can be observed throughout the whole year, but is more intense at the beginning and during the breeding period. Social preening takes place most regularly between breeding partners and parents and offspring. Males preen their female partner as well as other females. Sometimes males preen other males, but females never preen other females. The preening of the partner's body is not restricted to special parts even parts which a bird could easily access by itself (i.e. toes, back or wings) are groomed.

The Northern Bald Ibis shows a distinct preening invitation posture. While close to its partner the bird is "greeting" (fig.) and thereafter lowers its head, wings and tail. At the same time the crest often is erect (Fig. .3) . The NBI remains in this exposures for some seconds until the partner starts grooming.

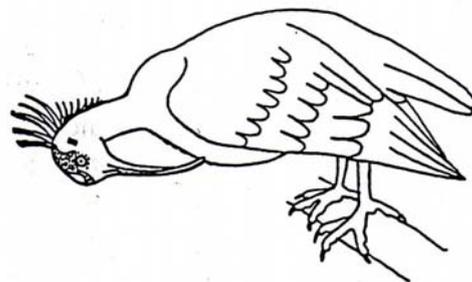


Fig. . 3: invitation display for social preening

3 Agonistic behaviour

As a gregarious bird that naturally lives in groups up to 20-50 individuals (birds) (with group size up to 500 birds reported from the past!) the Northern Bald Ibis has evolved many different appeasement and aggressive displays. Within a Northern Bald Ibis group each member knows each other very well and a raking within the group exists.

3.1. BEHAVIOUR WITH LOW OR NO AGGRESSIVE INTENTIONS

3.1.1. Greeting

Greeting is undoubtedly the most distinctive and ritualised gesture in the Waldrapp Ibis. Greeting is defined here as a sequence that starts with raising the head and bill up to 90° and is finished by a jerky lowering of the head deep between the legs (Fig. xy). The crest is erect during this performance and the greeting display is nearly always accompanied with the “chrup” call (ETTL 1979). Males are greeting more often than females (PEGORARO 1983). The posture occurs less exaggerated between partners and between parents and their offspring. Greeting often inducts greeting between other birds and seems to stimulate the whole colony.

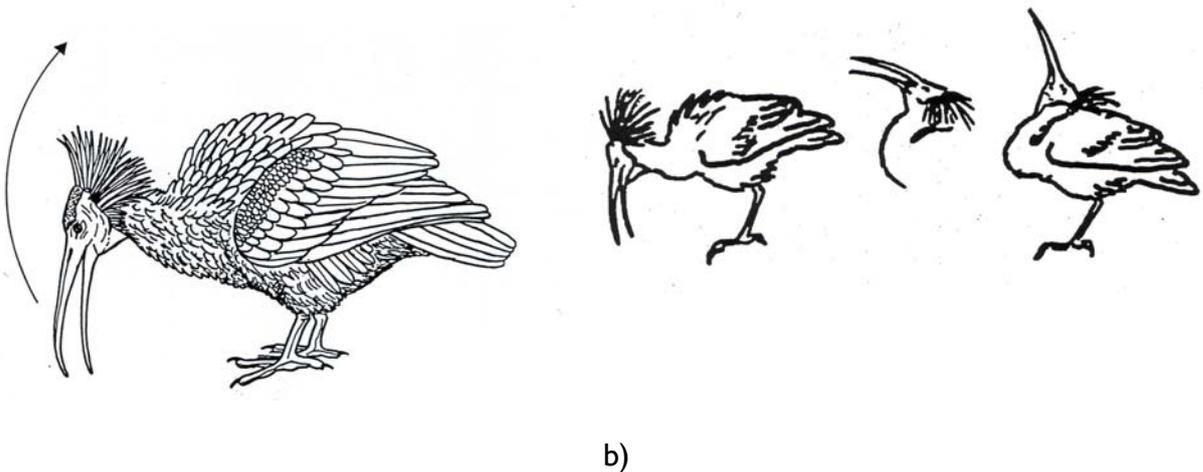


fig. 4: agonistic behaviour: **greeting** (a) The head is lowered in a jerky movement when the birds is greeting; course of greeting (b)

3.1.2. Appeasement gesture

When approached by an aggressive bird, the Northern Bald Ibis first cowers and takes the head close to its body. If the aggressive bird continues to attack, the attacked bird erects straight up with its head close to its body (Fig. 5). During this posture the appeasing bird insistently looks in a direction opposite to its counterpart, and may remain in this posture for some minutes.

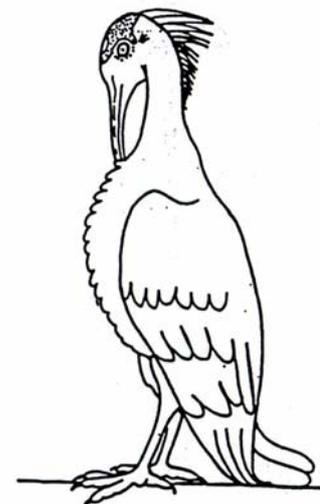


Fig. 5: Agonistic behaviour: appeasement display

3.1.3. “Pair sitting”

Colony members or breeding partners are often seen sitting very close to each other. The pair sitting is not restricted to the breeding period but can be seen the whole year through (ETTL 1979). In particular pair sitting is practised regularly in birds which know each other very well and have bred together several times seem.

3.2 BEHAVIOUR WITH AGGRESSIVE INTENTIONS

An aggressive tendency in a Northern Bald Ibis is indicated by erected feathers on the back, and supplanting attacks are often accompanied by an erection of the crest (TRILLMICH 1976). Direct attacks, mostly by hacking a counterpart with the bill, may occur but are rare, and even in this cases the other bird often is not touched.

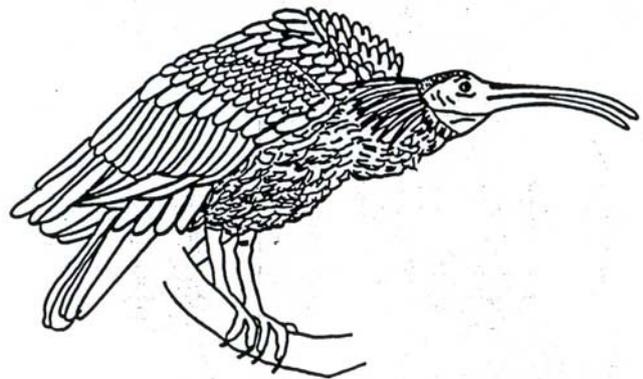


Fig. 6: agonistic behaviour: imposing

However, the soft bill cannot be regarded as a dangerous weapon and is not built to hurt each other. Males are more aggressive than females (up to three times, PEGORARO 1983). Females tend to avoid conflicts by leaving the aggressive partner. When the nesting sites are occupied, aggression between males is common but can hardly be observed during breeding. An overview of aggressive display is given in table I.

Attacks, Fights	
1 Hacking	the bird is hitting another one with its bill at any part of the body, mainly at the head: When the attacked bird fights back it is only a “bill battle” and no bird is getting hurt
2 Hacking in the air	Hacking in the air but the other bird is not touched
Threatening	
1 Attack intention	: the bird is running or flying towards another bird, head is kept close at the body, the bill points towards the other bird. This

	seldom ends with real attack,
2 pretended attack	“””: bird is moving slowly towards the other one, the feathers are ruffled to look “big”
3 Imposing behaviour	: is characterised by a repeated raising and straightening up of the body and head (Fig:) When lowering the head and body the plumage is ruffled. The movement is often repeated several times. When close to the counterpart the posture is directed not towards but averted off the other bird. (ETTEL 1979, PEGORARO 1996)
4 Threat looking	„ “: The bird sits still but is looking in a nearly staring manner at a counterpart .The aggressor is not moving until the other is giving way.

Table 1: Behavioural display of aggressive agonistic behaviour (sorted in a descending order to attack)

4. Courtship display

4.1. Nest selection and occupation

Greeting and sitting close together are the first signs that a pair bond is established. The nesting sites are occupied by the males first. While sitting at the nest site the male presents the possible nest site to the female in an obvious manner by scratching in the nesting site and rotating their bodies.

This behaviour is accompanied by greeting, imposing display and nest building intentions (Fig. a,b).

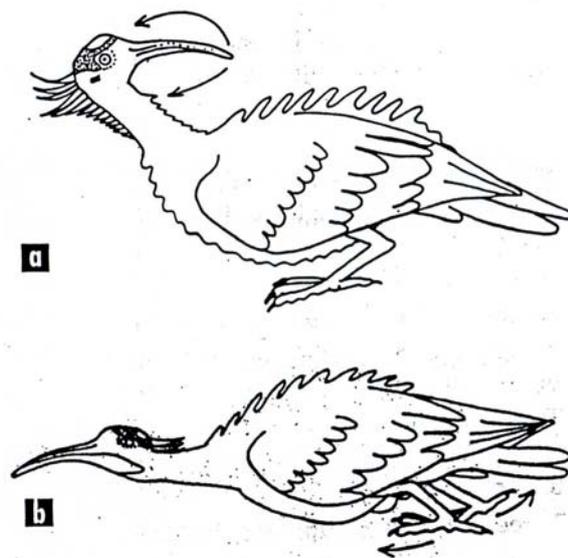


Fig. 7: showing of an adequate nest site (a)
Preparing a nest site (b)

In case the female is interested in the male and the nesting site, she joins the male that at first reacts aggressively with hacking in the female direction. If the female answers with appease behaviour the male stops hacking and starts with social preening.

4.2 Copulation behaviour

The first copulation occurs a couple of weeks before the first egg is laid. Copulation activity increases some days before the beginning of egg laying, decreases rapidly when the last egg is laid and reaches the lowest level around hatching. After the nestling are fledged copulation intensity increases, again probably indicating a tendency to start a second clutch. The very early start of copulation is supposed to be important for pair synchronisation (PEGORARO 1983, 1996). Nearly any copulation occurs close or at the nest site.

When the female is ready to copulate she crouches a little bit. The male mounts her back, takes a grip of the female's bill with the base of its own bill, and uses the wings to stabilise his balance (Figs 8 a, b). Both partners exhibit jerky and shaky bill movements. A copulation lasts for 20-70 seconds. After copulation both partners show distinct imposing behaviour (bill and crest erect, eye blinking, THALER et al. 1981).

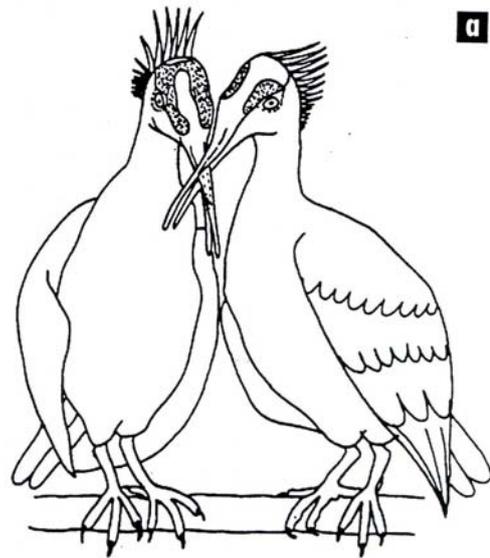


Fig. 8: precopulation behaviour (a); copulation (b)

5. Calls

Three different groups of calls can be distinguished in the Waldrapp Ibis. All calls are simple and just one to two syllables long.

5.1. "Chrup" or "joop" call

The "chrup" call has been described first by GESSNER (1606). It is used in different situations but the call seems to be used primarily to get more attention from or closer contact to

another colony member, or to avoid any contact at all. In particular “Chrup” calls are heard in the following situations:

- Greeting the partner and other colony members
- while exhibiting the nesting site to the mate
- before and during the copulation
- during imposing behaviour
- during threat behaviour

The “chrup”-call is most often heard during the pair bonding and breeding period and again during the phase of intense contact with the offspring and during courtship display activities in autumn. Although the “Chrup” call seems to be quite simple, there are individual differences which can be distinguished easily with some experience. Nestlings seem to know the “Chrup” call of their parents and react strongly when tape records of these calls are presented, whereas they show no reaction towards “chrup”-calls of other colony members (PEGORARO 1996).

5.2. “Gruh”-call

The “Gruh”-call also contains only one syllable and has been described as “gru” (WACKERNAGEL 1964), “Chruh” or Gruuh” (THALER et al. 1981) or “Couahh, yooohh” (SOOTHILL & SOOTHILL 1989).

The Northern Bald Ibis “Gruh”-call is heard when a bird is excited, although it does not make clear in which specific mood the bird is, which however, in most cases is indicated by the accompanying behaviour. While calling the birds keeps the head and bill high up and displays the distinctive red colour of the throat. Like the “Chrup” call the “Gruh”-call varies slightly from individual to individual and the birds seem to recognise their partner when calling “Gruh” (PEGORARO 1996). The “Gruh” call is heard

- during courtship display
- during the hatching of the chicks
- when a bird is disturbed
- when enemies are detected close to the nest or colony

5.3. “Bleating”

The “bleating” sounds like “ea-ea-ea” and this call can only be heard during close contact of two birds. For humans it sounds quite similar to begging calls of juveniles and “bleating” is

used to appease the partner. It is mostly heard when nest material is brought to the nest, when both partners are nest building, it also accompanies social preening and is uttered before copulation (PEGORARO 1996).

6. Breeding biology

6.1. Nesting sites and nest building

First pair bonding behaviour can be observed already during January, and at most places nesting sites are occupied in the mid of February, although the onset of these activities of course depends on the climate (southern colonies earlier, northern later). When a nesting site is occupied it will be defended energetically by the female and even more intensive by the male. Often sole imposing behaviour will prevent another bird to approach the occupied nesting site. However, if a counterpart has landed nearby, a “bill battle” may start.

Dominant birds often occupy a nesting site prior to other colony members and in many cases these birds reuse the nesting site already occupied in former years. Before starting a new nest the Northern Bald Ibis will remove the old nest material. Therefore the nesting sites should be cleaned by the keeping staff during January.

Both breeding partners participate in the nest building, which on average lasts for 30-50 days. At the beginning of the nest building activities the birds take thicker branches (for the nest bottom) and nest building is finished by using dry or fresh grass as stuffing material for the hollow. Even when the nest is ready the pair still carries fresh, soft branches with green leaves into the nest. The availability of an appropriate nest building material at these different phases is important for a calm and undisturbed breeding period. Males often carry more nest material into the nest site than females (PEGORARO 1983). The birds fix the branches together with quivering movements.

6.2. Breeding behaviour

The female NBI starts breeding when the first egg is laid, and from this point on the female becomes dominant over the male at the nesting site. Both sexes are breeding and the breeding lasts 28 days. When one partner takes over the breeding task it often brings some fresh nest material or feathers to the nest. After greeting both partners together put the newly brought nest material into the nest. The one which is leaving remains for some minutes close to the nesting site, and is preening or preens its partner on the nest.

6.3. Rearing the nestling, parent-sibling relationship

The young hatch within an interval of 2-3 days and thereafter nestlings are brooded for 14 days by both parents. During hatching the parents are obviously nervous and the incubation posture (compared to real breeding) changes in a way that the incubating bird sits somehow “higher” and “lighter” on the nest. The chick feeds by inserting its head and bill into the adult’s gullet to obtain regurgitated food (Fig. a, b). Social preening of the nestling and cleaning the nest occurs from the first day after hatching (PEGORARO 1983). After fledging the young are fed by their parents for another seven weeks (PEGORARO 1996).

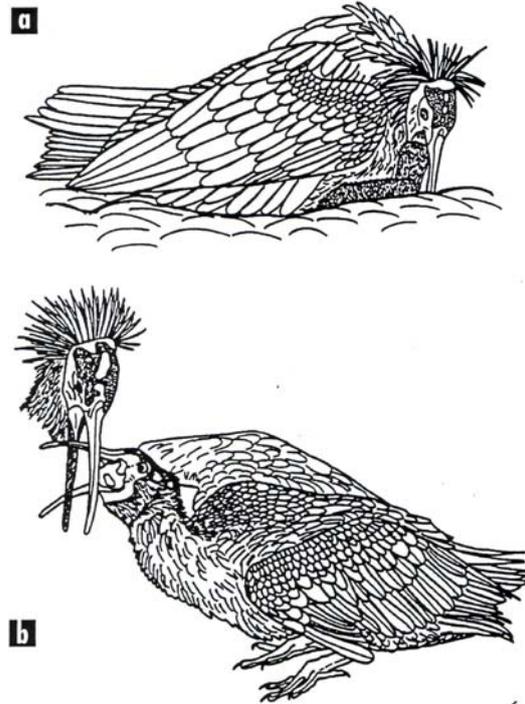


Fig. 9: brooding and feeding of small chicks (a) and older chicks (b)

The nestling fledges between the 42nd and 51st day. The contact between the fledglings and their parents however stays close. The first flight attempts are guided by their parents which also defend their offspring against colony members that are too curious or aggressive (THALER et al. 1981). During autumn and winter the contact gets less close but the intensity of parent-offspring relationship again increases at the beginning of the new breeding season. Yearlings are often seen in the colonies close to nesting sites in Morocco. Several fledglings from one colony may form a “youth group” and a separate social ranking is build up within these groups, which members stay in close contact until they become adult.

6.4 Sibling competition

Although clutch size (3-5 eggs) is comparatively large in the Northern Bald Ibis, often only one or two chicks fledge. During the postembryonal development there are two periods of high mortality of Northern Bald Ibis chicks, namely passive sibling competition and sibling aggression.

6.5 Passive sibling competition

As eggs are laid only every second day and breeding starts when the first egg is laid, the chicks hatch with a two day interval (SCHENKER 1976, OLIVER et al. 1979, THALER et al. 1981). According to this age difference older chicks are begging more often and intensively and younger chicks may be lost due to starvation because they are fed with less often (passive sibling competition).

6.6. Sibling aggression

The second period of high nestling mortality due to direct aggressive interactions between siblings occurs at the time of 14-28 days after hatching. This kind of nestling aggression can be observed in all Northern Bald Ibis breeding populations and is displayed by all chicks against younger siblings (see AHARONI 1929, SAHIN 1982). Aggression is displayed by chicks only when one or both parents are at the nesting site. When a younger chick moves or starts begging it will be attacked immediately and the attacks stop if the younger bird displays a distinctive appeasement behaviour (Fig. a,b) by lowering deep into the nest mound, staying calm and presenting the back side of its head. The aggressor pecks mainly on the hind head sometimes at the neck and wings of its sibling. As the bill of the chicks is soft there are hardly any injuries.

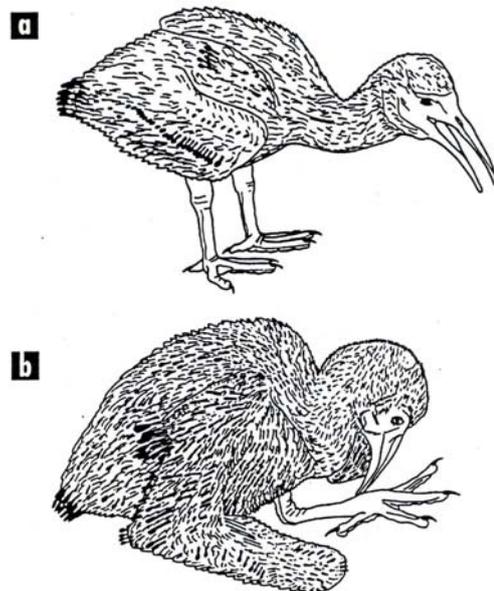


Fig. 10: nestling aggression: aggressive display (a) and appeasement display (b)

However, attacked chicks do not move or beg so that they are not fed at all or at least are the last ones which are fed by the parents. It seems to depend on the amount of food in the stomach of the feeding bird whether all are fed or not (SAHIN 1982, OLIVER et al. 1979).

The amount of aggression itself shows no correlation to the amount of food offered to the nestling. Hand reared chicks behave the same way although they are fed ad libitum. The sibling aggression occurs during the period of the strongest growth of a nestling (see Fig. 3). The aggression decreases rapidly after the 25th day and after a body mass of over 850g is

reached. If a younger chick survives this period of aggression they will gain weight very rapidly.

Acknowledgement:

Very special thanks to K. PEGORARO who made the drawings of the Ibises and allowed me to publish them here.

REFERENCES

- AHARONI, J. (1929): Zur Brutbiologie von *Comatibis comata* Bp. (*Geronticus eremita* L. Beitr. zur Fortpfl. Biol. Vögel 5:17-19.
- ETTL, E. (1979): Zur Ethologie des Waldrapps *Geronticus eremita* (L.) Verhalten und Sozialstruktur außerhalb der Brutperiode (Beobachtungen an der Kolonie im Alpenzoo Innsbruck. Diplom. Univ. Innsbruck.
- GESNER, C. (1606): Von dem Waldraben *Corvus sylvaticus*. In: Thierbuch. Heidelberg.
- OLIVER, W.L.R., M.M. MALLET, D.R. SINGELTON & J.S. ELLET (1979): Observations on the reproductive behaviour of a captive colony of the Bare-faced Ibis *Geronticus eremita*. Dodo 16:11-35.
- PEGORARO, K. (1983): Weiteres zur Sozialstruktur des Waldrapp (*Geronticus eremita*) PEGORARO, K.(1996): Der Waldrapp. Sammlung Vogelkunde. Aula Verlag, Wiesbaden.
- SAHIN, R. (1982a): Eltern- Kind Beziehungen der freilebenden Waldrapen (*Geronticus eremita* L.) in Birecik (Türkei). Ökol. Vögel 4: 1-7.
- SAHIN, R. (1982b): Zur Form der Ehe freilebender Waldrappe (*Geronticus eremita* L.) in Birecik (Türkeri). Orn. Mitt. 34: 162-163.
- SAHIN, R. (1982c): Beitrag zum Fortpflanzungsverhalten der freilebenden Waldrappe (*Geronticus eremita* L.) in der Türkei I. Mitt.: Ankunft, Paarbildung und Nisten. Ökol. VÖGEL. 4: 181-190.
- SCHENKER A. (1979): Beobachtungen zur Brutbiologie des Waldrap (*Geronticus eremita*) im Zoo Basel. Zool. Garten. N.F. Jena 49: 104-116.
- SOOTHILL, E. & R. SOOTHILL (1989): Wading Birds of the World. Blanford Press London.
- THALER E., S. ETTL & J. JOB (1981): Zur Sozialstruktur des Waldrapps (*Geronticus eremita*)- Beobachtungen an der Brutkolonie des Alpenzoo Innsbruck. J. Orn. 122:109-128.
- TRILLMICH, F. (1976): Spartial promiximity and mate specific behaviour in a flock of budgerigars (*Melopsittacus undulatus*, Aves Psittacidae). Z. Tierpsych. 41: 3
- WACKERNAGEL, H. (1964): Brutbiologische Beobachtungen am Waldrapp, *Geronticus eremita* (L.), im Zoologischen Garten Basel. Orn Beob. 61: 49-56.