SIMPLIFIED METHODS FOR BREEDING TRAGOPANS AND EARED PHEASANTS, WITH SPECIAL EMPHASIS ON THE CABOT'S TRAGOPAN AND TIBETAN WHITE EARED PHEASANT.

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Introduction

The beautiful Cabot's tragopan (Tragopan caboti) and the majestic Tibetan White Eared Pheasant (Crossoptilon crossoptilon drouyni) are both native pheasant species to China. Both taxa are threatened by extinction due to the uncontrolled logging, indiscriminate destruction of their habitat and hunting for food (see annexe Threatened Birds of Asia – The Birdlife international Red Data book, (2001), Cambridge, UK). They are both considered as "vulnerable" in their native habitat (China) by the I.U.C.N.Both taxa are listed on appendix 1 of the CITES and can only be transported with all necessary CITES and other documents.

In 2003, the captive population of the Cabot's Tragopan (200/…/300 individuals) in the West was derived from the few individuals (not more than 10 live specimens), which were imported from Hong Kong and China by the previous Pheasant Trust, Norwich in the U.K. in the early nineteen sixties. According to the Trust's annual reports something like 75 youngsters were bred in the period of 1963/…/1977 in the U.K. using natural mating methods (Wayre P. (1977). In 1978 approximately 10 pairs were shipped from the U.K. to the collection of Mr. Charles Sivelle in NY, USA and to the Howe brothers in Aylmer, Ontario, Canada, who bred several hundred Cabot's tragopans since the early eighties using artificial mating methods (Sivelle C. (1987) (pers. comm. C. Sivelle, U.S.A. and G. Howe, Canada). A studbook has been maintained and is being kept by the World Pheasant Association for this endangered pheasant showing its demographic distribution in western captivity (Olney P. (1989)).

Lately (2003), both the Cabot's tragopan and White Eared Pheasant have shown serious difficulties in reproduction in the West. Most of their owners were facing high numbers of infertile eggs and/or high rates of embryonic mortality. We also did encountered such problems working with these two Chinese pheasant species using both natural and artificial mating methods (Hermans F. (2003). The aim of this article is to give the reader some basic understanding of the difficulties we have come across keeping and breeding both species and ultimately, what we have done to resolve these obstacles.

1. A complete description, including photographs and diagrams of the area and facilities where the birds have been held and/or maintained in captivity.

1a. Description of the area

Cabot's tragopans and White Eared pheasants in the facilities in Belgium. This pheasantry can be visited on the INTERNET via its well-known website : http://www.tragopan.be

It has been proven that the crisp air and mild climate in this particular area in Belgium is ideal for keeping and breeding tragopan and eared pheasants. Average summer temperature in the Flanders is about 18 Celsius degrees and average winter temperature is about 2 Celsius degrees, which has a significant influence on the reproduction of these Himalayan species in captivity.

1b. Description of the facilities

1. Pens for adult birds

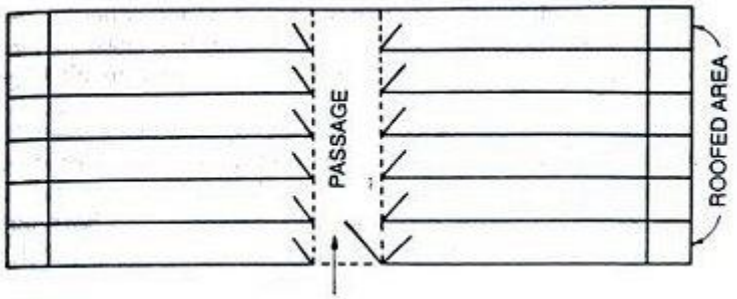
Tragopans and eared pheasants are very adaptable and most of them very quickly become used to living in captivity and survive for a reasonable length of time, provided most of their requirements are met. Our experience has shown that whatever type of pen is made to accommodate them, a few basic features are essential :

1 - The site of their pens has to be selected in such a way that they get maximum benefit from the morning sun.

2 - The ground in the outdoor pen has to be be slightly raised, with a light loam or sandy soil, so that it drains well. Admittedly, this is an expensive way of doing things, but in the long run, the initial costs will be more than recouped in terms of healthier birds with good breeding results. Tragopans can easily stand rain and most of them even snow, but none of them like wet feet.

3 - The pens are of economic shape and perhaps most efficient in design. The aviaries are a series of rectangular pens with a corridor in the middle for servicing and also for moving birds from one pen to another without having to catch them, which almost always puts a bird under a certain amount of stress, never mind how tame and docile they are. Each outdoor enclosure measures at least 6 x 2 x 2 meters high and the indoor pens measure 2 x 2 x 2 meters high. These smaller types of aviaries are being used for artificial mating. We have established bigger outdoor aviaries for those pairs which do reproduce by natural mating. Concrete slabs have been laid down in the corridors to facilitate the servicing of the pheasants and the maintenance of the vegetation in the aviaries.

Diagram : Plan for a double (parallel) series of pens for tragopans



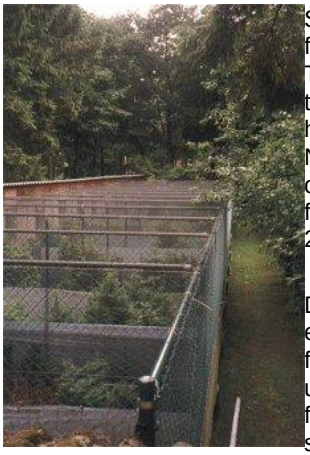
4 - All indoor aviaries have concrete flooring elevated a few centimetres above the outside aviary to keep water outside during heavy rainfall.

5 - The corridor between the outdoor aviaries is provided with a door at one end only and is only wide enough to let the keeper move around freely. From the corridor a full size door gives access to the run portion of each pen. This door can be opened into the pen. No bushes or trees are planted in the area over which the door swings when opened. If a bird is to be moved to a distant pen of the unit, it is moved through the corridor. In this case , to move a bird, all that is required is to walk behind it slowly and the bird will continue to walk a few steps ahead. Under no circumstances are our pheasants hurried forward, to avoid stress.

6 - All the aviaries have been rendered rodent proof at considerable expense. Mesh size is 13 x 26 millimetres and the top is roofed with nylon netting plus wire mesh of 4 x 4 centimetres. The frames measure 2x2 meters and are made of stainless steel pipes. Plastic coated wire mesh is put in between. This design has been made predator proof by the use of a proprietary agricultural electric fencing system, called, "Hotline". Admittedly, all this has added considerably to the costs of the pens but in the long run it means that our birds are totally protected from rodents. Also, because of the materials used, there is almost no maintenance to undertake, which adds to our peace of mind.

7 - The cages are planted and many of them are vegetated. This is done for the aesthetic value and as a screen for shade and protection against the weather. All perches are kept inside and are natural tree branches. The birds are lured with artificial lighting during sunset to come indoors for the night. Natural rocks and large tree stumps have been placed in most of the outdoor aviaries.

2. Pens and facilities for young birds and hens meant for A.I.



Sufficient pens for rearing young tragopans and eared pheasants (during the period from the end of May till November) have been provided by us since the early nineties. These additional aviaries have been constructed in the same way and are made from the same materials as used for the adult tragopan and eared pheasants. Our plan has always been to keep these aviaries empty during 4 months of the year (from November till February) to be available for unforeseen circumstances. These consist of an indoor and outdoor aviary, in which we raise the juvenile birds till they are ready for shipment (October-November). Each outdoor enclosure measures at least 4 x 2 x 2 meters high and the indoor pens measure 1.5 x 2 x 2 meters high.

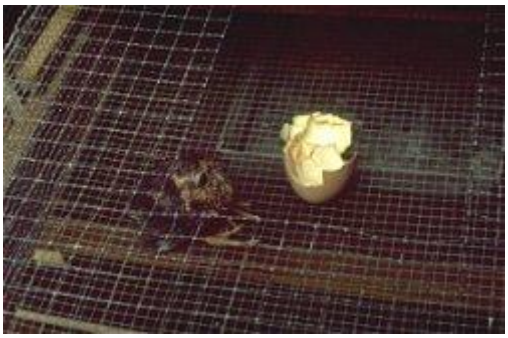
During the breeding season, which usually starts early March in Belgium and ends early June, we often use these "rearing" aviaries for those hens we consider suitable for artificial insemination (A.I.). We have achieved particularly good results with A.I. using these smaller type of aviaries for the tragopan hens intended for A.I.. Each female is kept alone and has only visual contact with her co specifics, giving her a safe place to hide and having enough privacy to lay her eggs. Especially with tragopan and also with other pheasant species which show fertility problems in captivity, we have achieved remarkable results using these facilities.

3. Rearing boxes for the raising of young chicks

All tragopan and eared chicks are raised in rearing boxes using artificial heating and automatic drink dispensers. Chicks of the same species, and of the same age, are raised together, in groups of 5 up to 10 chicks for at least 4 to 5 weeks. At the age of 6 weeks they are transferred to the pens meant for young birds, where they are kept indoors, with artificial heating, till they are strong and vital enough to be released to the outdoor pens. All chicks are raised on wire-mesh floorings and/or on rubber mats in their early stages of life. We take care that they are raised in a humane and clean environment at all times.

4. Incubators and hatchers

Almost all our tragopan and eared pheasant eggs are incubated using Grumbach forced-air incubators, and are transferred at the end of incubation to another room and set in clean hatchers for hatching. Almost all eggs are used for artificial incubation to give a better control over the embryonic development and incubation procedures. At the end of the incubation process all fertile eggs are transferred to the hatchers in which the chicks are born and kept for one extra day to hatch and to dry. From here on they are all transferred to their rearing boxes where they are raised till they are about 5 weeks old.



5. Quarantine and hospital

New birds of both the Cabot's tragopan (8 individuals) and of the Tibetan White Eared Pheasant (10 individuals) have been imported by us in the period of 1999/…/2002 to diversify the gene-pool of our stock birds. Immediately after importation, all new birds were put in isolation, away from our stock birds, to give the newcomers a chance to acclimatize to their new environment and to settle down well. Admittedly, new infectious diseases were kept at a safe distance from our stock birds. Hence, the risk of spreading of such diseases was kept at a minimal level. Also there is always a strong veterinarian and personal control on new birds while in quarantine.

Apart from this, we also maintain one small hospital unit to take proper care of sick birds, which are put in a small cage, given warmth and proper medication.

6. A.I. room and equipment

Artificial Insemination (A.I.) is performed on all those species that are known to produce large numbers of infertile eggs, because of wrong behaviour, physical disability and/or inbreeding. Cabot's tragopan has proven to be a prime candidate for A.I., whereas the White eareds have not. In particular, the males in White eareds, proved to be extremely stress-susceptible and hence not very suitable for A.I.

We can confirm that we have done more than a thousand inseminations on captive pheasants in the course of the last 10 years. We have performed A.I. with great success on tragopans, coppers (Syrmaticus soemmerringi), ruffed pheasants (Chrysolophus), and firebacks (Lophura ignita) for many years

2. Statement on the minimum number of years we have maintained tragopans and eared pheasants, and species/ numbers bred.

We have kept and bred 4 species of Tragopans and 3 species of eared pheasants since 1990. The 4 tragopan species are Satyr (Tragopan satyra), Temminck's (Tragopan temmincki), Blyth's (Tragopan blythi) and Cabot's.

A reasonable number of young tragopans has been bred in the period of 1990 till 2000 by us using both natural and artificial mating methods. Most of the chicks (about 75%) did belong to satyra and temmincki. Blyth's and Cabot's Tragopan were only bred in small numbers in these days. We attribute this to the inbreeding depression in both species. It so happened that in the Satyr and Temminck's tragopan we were able to collect genetically healthy offspring from various private breeders in Western Europe and North America in the late 1980's. Unfortunately, that was not possible for Blyth's and Cabot's tragopan at that time. The various individuals which were shipped to us, proved to be very inbred.

We have done A.I. on a routine basis in our pheasantry in Belgium since 1993 to augment the numbers of chicks born and to yield fertility figures. A remarkable increase in total numbers of chicks, born and bred per tragopan hen, has been achieved since then.

On the other hand, we have kept and bred 3 species of the eared pheasant using natural mating methods; Blue (Crossoptilon auritum), Brown (Crossoptilon mantchuricum) and White eared in the period 1990/…/2000. A.I. has been tried, especially on the White eared because of the high number of infertile eggs, which we collected in the period of 1990/…/2000. Unfortunately, the males proved to be very stress-sensitive. As a result, we decided to withdraw A.I. our eared pheasants.

3. Statement on mortalities resulting from our activities with these or similar species in the last 12 years and causes of such mortalities.

We had almost no losses in the chicks (born) in the course of the last 12 years.

Our experience in breeding tragopans and eared pheasants in the period of 1990/…/2000, especially with Cabot's tragopan and White eared, has shown to us that there were 3 main difficulties to overcome :

Problem nr. 1 "Fertiltiy in the eggs"

Fertiltiy figures in Cabot's tragopan and White eared in our pheasantry in the early nineties was less than 25 % using natural mating methods. Most of our males seemed to have lost their libido, necessary to come into sexual peak condition and to copulate with the females. We attribute this condition to faulty breeding (inbreeding). 30 years of indiscriminate breeding without the introduction of any new birds from China was at the root of this phenomenon. Most of these inbred males were still able to produce viable semen. However, they proved unable to copulate satisfactoraly with the females.

The main losses which took place in our pheasantry, were with both in Cabot's and Blyth's, and were restricted to the fertile eggs (unborn chicks). Since we started doing A.I. as a routine matter in our tragopans (1993), we were able to correct fertility. We achieved good fertility figures, mostly higher than 85% in all 4 species.

In our White eareds we were not able to correct fertility, due to the shortage of suitable A.I. males and sufficient viable semen.

Problem nr. 2 " Hatchability of the unborn chicks"

Many tragopan embryos, especially in Cabot's and Blyth's, did die early in the incubation process (after 10 days of incubation) and a further number died just before pipping. Most of these chicks proved to be too weak to hatch. Satyr and Temminck's tragopan eggs and chicks, on the other hand, which were treated in exactly the same way as Cabot's and Blyth's, did not pose any particular problems after successful A.I. and artificial incubation.

Hatchability of the chicks, however, in Blyth's and Cabot's in our pheasantry, on the contrary, remained low (lower than 40%), though artificial incubation and hatching was done in the same incubators and hatchers as for the eggs of Satyr and Temminck's tragopans. In the latter 2 species both fertility and hatchability has always been higher than 85% thanks to A.I. and the availability of strong and healthy genetic bloodlines.

Problem nr. 3 "Loss of natural immunity in the adult inbred stock"

There is no denying the fact that we have lost several specimens of our adult tragopans, especially in Cabot's, and adult White eareds between 1990/…/2000 due to aspergillosis. We attribute this condition to the high degree of inbreeding in both pheasant species at that time. Almost no new imported adult Cabot's tragopan of this particular source (USA/Canada)/generation survived more than 6 or 7 years, whereas the normal life span for such tragopans is between 15/…/20 years. The main difficulty in the treatment of aspergillosis is with its lengthy diagnosis and combination therapy. We believe that the increased disease susceptibility, especially in Cabot's, is coupled with the loss of natural immunity response in the adult inbred stock, which has its roots in the faulty breeding of the species soon after its importation into the West.

4. Steps taken to avoid or decrease such mortalities.

The steps we have taken to avoid or decrease such mortalities are as follows :

1. We have done A.I. on large scale since 1993 in all our tragopans to increase the total number of new and successful genetic combinations. For this, viable semen of different males has been collected and inseminated in different females twice per week during the breeding season, in an attempt to identify the healthy genetic pairings. As a result, we have been able to increase the fertility in the eggs in all 4 species of tragopans, explaining the greater number of Satyr and Temminck's tragopans chicks born since 1993. Unfortunately, the same increase in total number of chicks in Cabot's and Blyth's tragopan, was not so much apparent due to the high degree of embryonic mortality during artificial incubation.

2. We have kept proper records of the samples of semen collected and of the family relationships of the eggs and consequently of the chicks born to guarantee healthy genetic pairings in the pheasantry. Proper record keeping of the eggs laid, eggs available for incubation, chicks born/unborn, has been a conditio sine qua non. It is fundamental to keep track of all inseminations done and of all the eggs being laid during the breeding season for good fertility and genetic management of our stock.

3. In addition, we have imported 8 new F3 Cabot's Tragopans during the last 2 years from one American and one English breeder to enlarge the genetic diversity of our present stock in Belgium (pers. comm.. R. Olsen, Santa Cruz, CA, USA). The same has also been done in 2000 for the precious Tibetan White Eared Pheasant. We have imported new stock birds (10 birds) from one American breeder, who imported his parent stock directly from China (pers. comm. K. Landig, Fremont, Ohio, U.S.A.). All these new imported birds were known as F3 imports (so offspring from F2 generation Chinese birds). The introduction of these new arrivals into our breeding programs immediately resulted in the correction of the above mentioned breeding problems. Many more young Cabot's tragopans and White Eareds have been bred by us in the course of the last 2 years using natural mating methods than ever before. A.I. is still done in Cabot's by us, just to yield fertility and to lower the risk of infertile eggs. Many young males, younger than 12 months, in both Cabot's and White Eared, are now able to copulate and produce healthy chicks, which was impossible before.

4. It is understood that these new Cabot's are offspring from stock birds which were directly imported from China (pers. comm.. R. Olsen, Santa Cruz, CA, USA) and which are not closely related to any other Cabot's tragopan in the West (Zheng G. et all (1986) Zheng G. et all (1987a). the same also goes for these new Tibetan White Eareds which we imported in the course of the last 4 years and which have reproduced so well (pers. comm. K. Landig, Fremont, Ohio, U.S.A). As such, the future for both Cabot's tragopan and Tibetan White Eared pheasant looks very prosperous thanks to these recent new imports of fresh adult Chinese stock birds. The institutes in China, which have shipped or which have been involved with the export of these new birds are the Normal University Beijing, the Guilin Zoo (Collar N.. 2001), the Captive Breeding Center for Endangered Species in the north of Beijing, China and the Wildlife Conservation Center, Forestry Department of Hunan Province, China. We all owe a great debt of gratitude to those brave people in China who managed to ship new blood of both endangered pheasant species with all necessary documents to reliable breeders in the West. We plan to import a few more pairs of Cabot's tragopan and White Eareds from abroad (China) to safeguard these wonderful birds in captivity.

5. Conclusion

We are proud to say that we have been able to correct errors in breeding Cabot's tragopan and Tibetan White Eared Pheasant, which have taken place in the past using both natural as artificial mating methods.

Meanwhile, many F4-youngsters of both species have bred by us and these are suitable to revitalise the current inbred stocks of both endangered species in Western captivity. We believe that many more new Cabot's tragopans and Tibetan White Eared will be born using natural mating methods than has ever been done before in the past.

Artificial insemination has proven its merits, especially in breeding Cabot's tragopans. Thanks to A.I. we have been able to quickly identify the healthy genetic pairings and to augment the total number of healthy chicks being born in our pheasantry. We are convinced that without A.I. it would have taken us much longer to increase the total numbers of successful matings.

At present time (2007), both Cabot's tragopans and Tibetan White Eared Pheasants are breeding very well in the West thanks to the import of fresh blood from China and the correct application of A.I. in our pheasantry. We are convinced that all 3 breeding problems, as mentioned above, belong to the past in our stock birds. It is now hoped that the present new genetic diversity in both endangered Chinese pheasants will be maintained for many generations to come in Western captivity.

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