

## **Gizzard Impaction in Lesser Rhea Chicks (*Pterocnemia pennata*) Raised on Farms in Patagonia, Argentina**

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**SUMMARY.** Impaction of the gizzard was diagnosed in 33 1-to-4-wk-old lesser rhea (*Pterocnemia pennata*) raised on farms in Patagonia, Argentina. The birds showed anorexia, lethargy, constipation, dehydration, weight loss, and weakness. Necropsy revealed gizzard impaction by fibrous material, sand, rocks, and rubbish. Also, excess fibrous material was observed in the small intestine, and intussusception was found in one chick. Impaction of the gizzard observed in the present study was similar to that reported in other ratite species and confirmed that this disease can affect lesser rhea chicks raised in captivity. This disease affected 33 out of 41 (80%) dead lesser rhea chicks submitted to the Animal Health Unit of The National Institute of Agricultural Technology, Bariloche, Argentina, during the study period, so it can be a significant cause of mortality in farmed rheas in Argentina.

**RESUMEN.** *Reporte de Caso*-Impactación de la molleja en pichones de choique (*Pterocnemia pennata*) criados en granjas de la Patagonia en Argentina.

Se diagnosticó impactación de la molleja en 33 pichones de choique ó ñandú petiso patagónico (*Pterocnemia pennata*) de 1 a 4 semanas de edad, criados en granjas de la Patagonia, Argentina. Las aves presentaron anorexia, letargo, constipación, deshidratación, pérdida de peso y debilitamiento. A la necropsia se observó impactación de la molleja por material fibroso, arena, piedras y desperdicios. También se observó un exceso de material fibroso en el intestino delgado y se encontró una intususcepción en un ave. La impactación de la molleja observada en el presente estudio fue similar a la reportada en otras especies de rátidos y confirma que esta enfermedad puede afectar pichones de choiques cuando son criados en cautiverio. Esta enfermedad afectó 33 de 41 (80%) pichones muertos enviados a la Unidad de Salud Animal del INTA en Bariloche, Argentina. Este estudio sugiere que la impactación de la molleja puede ser una causa importante de la mortalidad en granjas de choiques en Argentina.

Key words: lesser rhea, gizzard, impaction, management, captivity

- Lesser rhea (*Pterocnemia pennata*) is a flightless wild bird, naturally distributed in the south of Chile and Argentina (1), that has been included as Appendix I in the Treaty on International Trade of Endangered Species of Wild Fauna and Flora held in Washington, DC on March 3, 1973. Since 1995, 19 commercial lesser rhea farms have been established in Patagonia, Argentina's southernmost region. The farming practices implemented in these farms have led to clinical problems in chicks of lesser rhea, such as impaction of the gizzard, yolk infection, and tibiotarsal rotation (10).

Impaction of the gizzard and proventriculus has already been reported in ostrich (*Struthio camelus*) and great rhea (*Rhea americana*) as a result of improper diets and management, inadequate facilities, confinement, and stress (4,6,9,11). The occurrence of gizzard impaction in ostrich and great rhea is characterized clinically by chronic inappetence, diarrhea, dehydration, ruffled feathers, and general weakness (5,9,11,13). However, to the best of our knowledge, the condition has not been described in lesser rhea. The only reference to gizzard impaction in this

species we found in the literature is a mere mention of the disease with no description of clinicopathologic findings provided (10).

From 1997 to 1998, our laboratory received reports of diseases in lesser rhea chicks across Patagonia. This paper describes the occurrence of gizzard impaction in chicks of lesser rhea with special reference to clinical and pathologic findings.

## CASE REPORT

**Case history.** Forty-one dead chicks from three farms were submitted for necropsy to the Animal Health Unit of The National Institute of Agricultural Technology in Bariloche, Argentina, between August 1997 and January 1998. Clinical data and information about management in each farm were available in every case.

All the birds had been raised from eggs incubated artificially, and their age ranged from 1 to 4 wk. The chicks were housed in groups of 15-45 in nursery pens and open paddocks of 20-300 m<sup>2</sup> from hatching to 5 mo of age. New animals were frequently introduced into these pens. In two farms, the pens were partially covered with pastures of alfalfa (*Medicago sativa*), ryegrass (*Lolium perenne*), and weed herb (*Polygonum aviculare*), whereas in the third farm, the pens were bare ground. Rubbish was frequently found in the pens. The birds were fed on a mixture of alfalfa hay, fresh alfalfa, and a concentrate ration containing 22% protein, 9% fiber, 4% fat, 3160 kcal/kg, 1.2% calcium, and 0.6% total phosphorus.

The clinical signs reported by the owners were progressive loss of appetite, lethargy, constipation, weight loss, respiratory distress, weakness, and abnormal position of the head. After a few days, affected birds became recumbent. The earliest age at which chicks showed clinical signs was 7 days and the latest was 30 days (Fig. 1).

**Necropsy findings.** Postmortem examination of 33 (80%) of the dead chicks revealed severe emaciation and dehydration of the carcasses. The gizzard was firm, doughy, and markedly distended and occupied most of the abdominal cavity (Fig. 2). Most commonly, the gizzards were completely impacted with a solid mass of fibrous material and sand (Figs. 2, 3). There was also marked dilation of the proventriculus.

Foreign objects, including pebbles, wooden sticks, leaves, staples, and pieces of glass, metal, plastic, sticky tape, and aluminum foil, were also found in 15 cases (Fig. 4). In 14 (42%) chicks, the pylorus and the duodenum were also impacted with fibrous materials (eight cases) and sand (six cases) (Figs. 3, 4). A small intestinal

intussusception was found in one chick. The affected intestinal area of this bird was congested and obstructed with fibrous material over a distance of about 15 cm.

**Laboratory findings.** Samples from gizzard wall, liver, lung, kidney, and yolk sac from 10 birds were plated onto blood and McConkey agar and incubated at 37 C for 48 hr. No pathogen was isolated in any case.

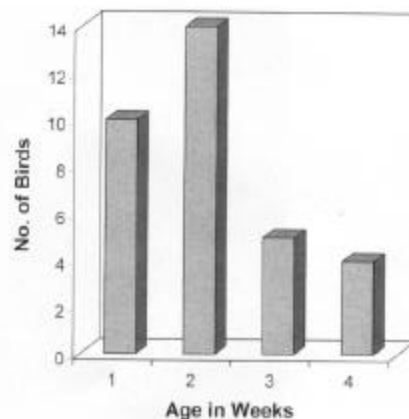


Fig. 1. Age distribution of lesser rhea diagnosed with impaction of the gizzard.

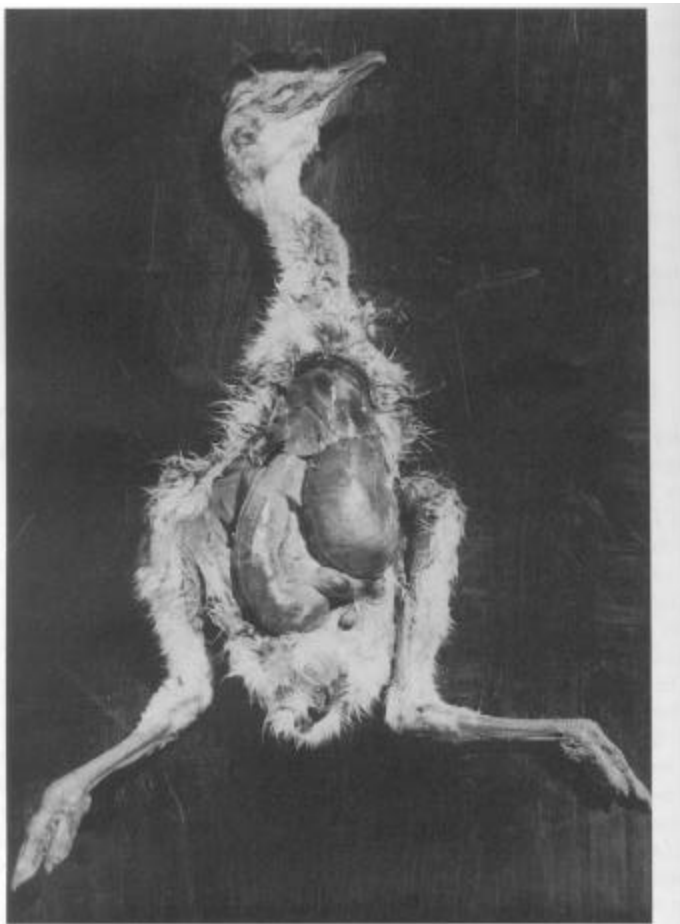


Fig. 2. Conspicuous dilation of the gizzard seen in a necropsied bird.

## DISCUSSION

Impaction of the gizzard and proventriculus by ingestion of fiber and foreign materials has been described in 2-to-4-mo-old farmed ostriches and great rheas in South Africa and the United States (3,9,11). In our study, the lesser rhea chicks that died with impaction were younger (1-4 wk old), but the clinical signs and postmortem findings were similar to those previously described for ostriches and great rheas (4,5,9,11). The occurrence of intussusception together with gizzard impaction has also been reported in great rhea (3).

Ratites need fiber to meet their microbiological demands in the lower gut during the growing and maintenance stages (> 12 wk old) (7). The fiber digestibility in young ostriches increases linearly up to 10 wk of age and reaches a plateau at 17 wk of age (7). Although information about variation of fiber digestibility with age in lesser rheas

is not available, it is likely to be similar to that of ostriches. If this is the case, the capacity to digest fiber of our affected birds must have been low at the time they became sick. Thus, long-stemmed alfalfa stalks and other long fibrous materials observed in the gizzard of these birds suggest that the gizzard impaction was initially caused by inadequate feeding of the animals (7,12). In this study, the number of cases of impaction of the gizzard decreased with the age of the animals (Fig. 1), which suggests that the feeding management of lesser rhea should be most careful in younger birds.

The diet of lesser rheas in their native habitat consists of 61%-75% shrubs and subshrubs (2), whereas in captivity, it is based on formulated feeds and limited grazing. The differences among formulated and natural diets probably have a role in the causation of impaction.

It has been recommended that a pen surface of 18-22 m<sup>2</sup> should be available for lesser rheas under 3 mo of age (10), although the surface of the pens in three farms of our study was well below this value.

The stress of confinement together with access to foreign materials in the environment seem to play an important role in the dietary indiscretion described in farmed ratites (3,4,8,13). The stress of transport and introduction of young ostriches into a new enclosure also has been associated with indiscriminate eating (6,11). In this report, continuous introduction of new birds into the pens and small pen surface could have contributed to the indiscriminate ingestion of fibrous material, sand, and foreign objects observed in the gizzard.

To prevent gizzard impaction in ratites, reduction of the proportion of fiber in the diet of chicks of 1-4 wk of age is recommended (12). The alfalfa should be introduced gradually and cut in small pieces in order to facilitate fiber digestion. Also, owners should be advised to reduce bird movements within groups and between enclosures and facilities, as well as to provide adequate

pen surface and to remove foreign objects from the environment. This paper shows that impaction of the gizzard may be an important cause of mortality of farmed lesser rhea in Argentina.

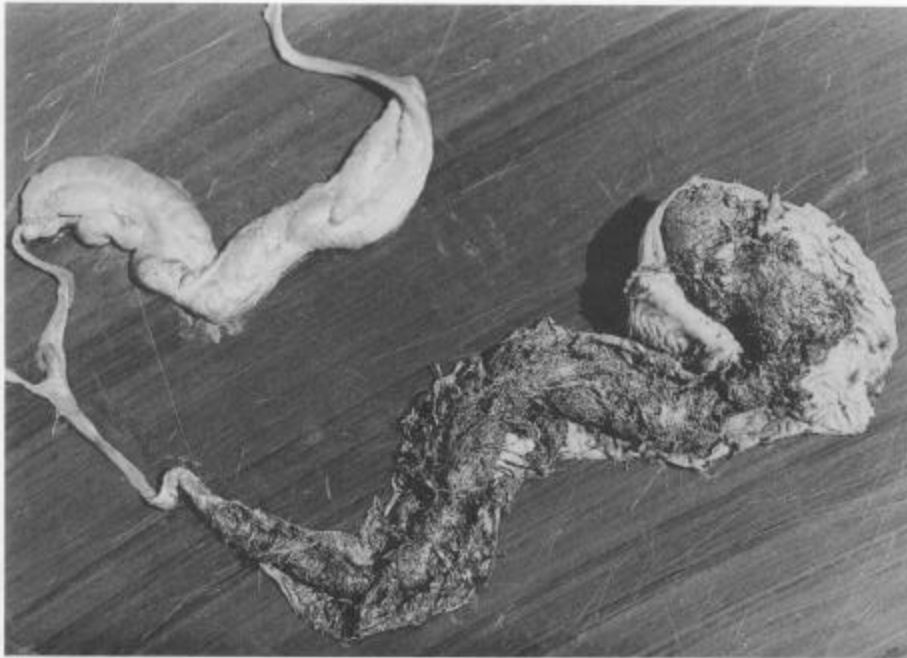


Fig. 3. Impacted gizzard and duodenum filled with a solid mass of mostly fibrous material in a lesser rhea chick.

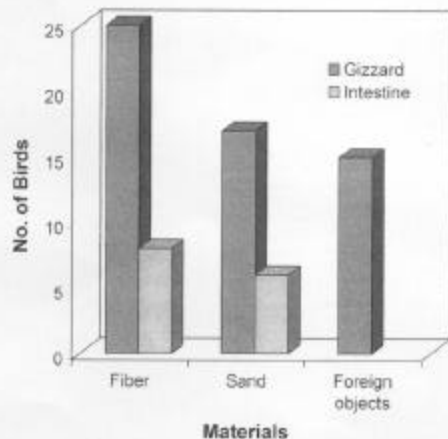


Fig. 4. The impacting material found in the gizzard and intestine of affected birds.

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