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PARY ASPERGILLOSIS IN A GREAT RHEA (RHEA AMERICANA)

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Elizabeth Chang Reissig; Francisco A. Uzal;
Adriana Schettino; Carlos Robles

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CENTRO REGIONAL PATAGONIA NORTE
EEA BARILOCHE
C.C.277- S.C. de Bariloche
(8.400) Río Negro
biblioteca@bariloche.inta.gov.ar

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Case Report—

Pulmonary Aspergillosis in a Great Rhea (Rhea americana)

Elizabeth Chang Reissig,[AC] Francisco A. Uzal,[A] Adriana Schettino,[B] and Carlos A. Robles[A]

[A]Animal Health Unit, The National Institute of Agricultural Technology, CC 277, (8400) Bariloche, Argentina
[B]Microbiology Area, Veterinary School, National University of the Centre of Buenos Aires Province, Argentina

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SUMMARY. A 5-mo-old great rhea (*Rhea americana*) gradually became emaciated over a 1-wk period and died. Necropsy revealed several small yellow nodules in the lungs. Microscopically, the nodules consisted of granulomas containing numerous thin, 4-μm-diameter, septate, branching fungal hyphae. *Aspergillus fumigatus* grew readily on Sabouraud dextrose agar. This report appears to be the first of mycotic pneumonia in great rheas.

RESUMEN. *Reporte de Caso*—Aspergilosis pulmonar en un ñandú (Rhea americana). Durante una semana, un ñandú (*Rhea americana*) de 5 meses de edad perdió una cantidad considerable de peso y murió. A la necropsia se observaron varios nódulos pequeños y amarillos en los pulmones. Microscópicamente los nódulos consistían de granulomas que contenían numerosas hifas delgadas, de 4 μm de diámetro, septadas y con ramificaciones. En el medio agar Sabouraud dextrosa, el *Aspergillus fumigatus* creció fácilmente. Este parece ser el primer reporte de una pneumonía micótica en ñandúes.

Key words: *Aspergillus fumigatus*, pneumonia, great rhea

The six species of ratites are cassowary (*Casuarius casuarius*), emu (*Dromaius novaehollandiae*), kiwi (*Apterix australis*), ostrich (*Struthio camelus*), great rhea (*Rhea Americana*), and lesser rhea (*Pterocnemia pennata*) (6). The great rhea and the lesser rhea are naturally distributed in South America. Recently, commercial farming of great rheas has begun in Argentina. This is an important economic advance in diversification of primary industry in that country. Information about diseases of wild or farmed rheas in the literature is scant.

Aspergillosis is the most common mycotic infection of the respiratory tract in pet and wild birds (3,5,7). Several *Aspergillus* infections have been described in the respiratory tract of ostriches (2,4,8). However, to the best of our knowledge, no mycotic infection has been reported in the respiratory tract of rheas. This paper describes the occurrence of pulmonary aspergillosis in a farmed great rhea.

[C]Present address: California Animal Health and Food Safety Laboratory, Faculty of Veterinary Medicine, University of California–Davis, 105 W. Central Avenue, San Bernardino, CA 92408.

CASE REPORT

Case history and clinical signs. A 5-mo-old great rhea weighing approximately 10 kg was kept in an outdoor pen (surface 200 m²) with 35 other juvenile great rheas. Several chickens were also present in the farm and they had free access to the rheas' pen. All the great rheas had been raised in the same farm from eggs incubated artificially. The birds were fed a mixture of alfalfa hay and a concentrate ration *ad libitum*, but during the month before the clinical signs were detected, the concentrate ration had been changed to a mixture of corn,

soybean, and wheat. No antibiotic or antifungal treatment was supplied.

Lethargy, weight loss, and progressive weakness were the only clinical signs reported by the owner. The affected bird became recumbent a week after first showing clinical signs, and it died soon after that.

Gross postmortem findings. A necropsy was performed. The carcass was in poor condition, and several yellow nodules approximately 1 cm in diameter were scattered throughout the lungs and on the parietal pleura. No lesion was observed in the upper respiratory tract or in other organs.

Histopathology. Samples of lung were collected, fixed by 24-hr immersion in 10% buffered formalin, pH 7.2, embedded in paraffin wax, sectioned at 4 μm, and stained with hematoxylin and eosin, periodic acid–Schiff, and Grocott. Microscopic examination revealed multiple granulomas with eosinophilic necrotic centers surrounded by giant cells, macrophages, lymphocytes, and fibrous tissue. Among the inflammatory exudate were large numbers of 4-μm-diameter, parallel-walled, septate, regularly branching fungal hyphae. These hyphae were visible with hematoxylin and eosin as well as with the periodic acid–Schiff and Grocott stains.

Culture. Samples of lung were cultured on Sabouraud dextrose agar, with and without antifungal (cycloheximede 0.5 mg/ml), and incubated at 28 C. A pure culture of *Aspergillus* sp. was obtained on plates without antifungal after 5 days. This isolate was subcultured on Sabouraud dextrose agar plates without antifungal and incubated at 28 C and 37 C for 7 days. On the basis of its macroscopic and microscopic morphological features, the isolate was identified as *Aspergillus fumigatus* Fresenius.

DISCUSSION

Aspergillus fumigatus is the most common fungus causing aspergillosis (1,3). Fungal infections generally occur via inhalation of airborne spores from moldy feed, dust, dirty pens, and dirty and improperly sanitized hatchery equipment (1,3,5). The origin of the infection was not established in our study, but it is likely that some or all the factors mentioned above were involved and that overcrowding and contact with other avian species (i.e., chickens) were predisposing factors for this case.

Because aspergillosis is an opportunistic infection, stress and malnutrition may contribute to immunosupression and increased susceptibility to aspergillosis (5). Most rhea farms in Argentina keep birds in small spaces and offer inadequate diet. The farm in our study was not an exception to this.

Clinical signs of pulmonary aspergillosis in pet and wild birds may include inappetence, polydipsia, polyuria, anorexia, cyanosis, and nonspecific signs such as weight loss, lethargy, and dyspnea (5). The clinical signs and postmortem findings in our bird were similar to those previously described for other avian species with pulmonary aspergillosis (3,4,5,7,8). Definitive diagnosis was based on culture of the organism from the lesions and histopathologic examination of the affected tissues, but antemortem diagnosis was not performed and therefore no treatment was attempted. It is possible that other birds in the farm had subclinical infection. Because rhea farming is still a fledgling industry in Argentina, local veterinarians have little experience in health problems of these animals. Pulmonary aspergillosis should be included in the differential diagnosis of respiratory conditions of rheas.

This report shows that great rheas are susceptible to aspergillosis and that overcrowding and access to moldy feed should be avoided to prevent this disease. Also, appropriate practices of hygiene and sanitation should always be observed.

Although aspergillosis has been described in other ratites, this report appears to be the first of a mycotic pneumonia by *A. fumigatus* that was associated with mortality in a great rhea.

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