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Exotic Ectoparasites of Ostriches Recently Imported into the United States

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ABSTRACT: Eleven species of ectoparasitic arthropods were collected and identified from ostriches (*Struthio camelus*) recently imported into the United States from Africa and Europe. Four of these species are reported from ostriches for the first time. The parasites included adult hippoboscid flies (*Struthiobosca struthionis*) and 10 species of adult ixodid ticks (*Amblyomma gemma, A. lepidum, A. variegatum, Haemaphysalis punctata, Hyalomma albiparmatum, H. luscitanicum, H. marginatum rufipes, H. truncatum, Hyalomma* sp., and *Rhipicephalus turanicus*. As a result of these findings, the U.S. Department of Agriculture prohibited further importation into the United States of ostriches and other flightless birds on an interim basis.

Key words: Ostrich parasites, Hippoboscidae, louse fly, *Struthiobosca struthionis*, ixodid ticks, *Amblyomma* spp., *Haemaphysalis punctata, Hyalomma* spp., *Rhipicephalus turanicus*, survey.

The ostrich (*Struthio camelus*) is an unusual bird in that it has commercial value for purposes beyond meat and egg production or aesthetic considerations. In particular, there is a strong market demand in the United States for ostrich hides used especially in the manufacturing of boots. During the mid-1980's, annual domestic demand was approximately 90,000 hides, supplied almost exclusively by South Africa (Koh, 1988). Congressional trade sanctions instituted in 1986 against South Africa disrupted hide supplies and stimulated strong interest in development of an American production capacity for ostriches.

In the past few years, >1,500 American ostrich farmers have entered into the business, and the market value of a breeding pair of birds has soared to as much as $50,000 (Crawford, 1989). The size of the total domestic flock is still far short of the 150,000 to 200,000 birds necessary to support a slaughter industry, and the need for additional breeder birds greatly exceeds the available domestic supply, leading to a marked increase in importation of live ostriches.

Imported ostriches pass through various licensed private or governmental quarantine facilities, where they are examined and held for detection of various disease and parasite conditions, before release to their destinations with owners in the United States. Thus, a number of arthropod ectoparasites were collected from imported ostriches during 1989 and submitted to the parasitology unit at the National Veterinary Services Laboratories (Ames, Iowa 50010, USA) for identification. The reported geographic origins of these birds include Angola, Botswana, Portugal, and Tanzania. None of these parasites is an established resident of the United States.

A literature search reveals that four of the intercepted parasites, all adult ticks (Acari: Parasitiformes: Ixodidae), are previously unreported from ostriches. *Amblyomma gemma* (seven males) were taken from birds originating in Tanzania. Typical hosts for adult *A. gemma* include large herbivorous mammals, both wild and domestic, in dry regions of East Africa. *Haemaphysalis punctata* (one female) arrived on domesticated birds from Portugal. This tick occurs across Europe, southern Asia, and the Mediterranean Region into Egypt and Algeria, tolerating a wide variety of climates and primarily attacking large wild and domestic mammals in its adult stage. The present-day geographic range of wild ostriches lies outside that of *H. punctata*, and this infestation must have occurred under domestication in Portugal. This also is true for *Hyalomma luscitanicum* (one male), also arriving on birds imported from

Portugal. Normal hosts for adults of this tick are deer, rabbits and domestic livestock; its geographic range is Portugal, Spain, southern France, northern Italy, and Morocco (Hoogstraal, 1959). *Hyalomma albiparmatum* (12 males) were taken from ostriches originating in Tanzania. The known geographic range includes only semiarid areas of Kenya, Tanzania, and Togo. Typical adult hosts are large herbivorous mammals, both wild and domestic, especially cattle (Hoogstraal, 1956; Walker, 1974).

All of the other parasitic arthropods identified from imported ostriches were known previously from this host (Hoogstraal, 1956; Matthysse and Colbo, 1987; Walker, 1974; Zumpt, 1966). These include the ticks (Acari: Ixodidae) *Amblyomma variegatum* (one male), *A. lepidum* (32 males), *Hyalomma marginatum rufipes* (six males), *Hyalomma* sp. (four males identified by J. E. Keirans as probably atypical *H. truncatum,* but we believe them to be atypical examples of *H. impeltatum*), *Rhipicephalus turanicus* (49 males), and a fly (Diptera: Hippoboscidae) *Struthiobosca struthionis* (four adults) on birds arriving from Tanzania; *H. marginatum rufipes* (10 males, five females) and *R. turanicus* (four females) on birds arriving from Botswana; *Hyalomma truncatum* (Acari: Ixodidae) (one male, one female), *H. marginatum rufipes* (four males, one female), and *S. struthionis* (one adult, one puparium) on birds arriving from Angola; and *R. turanicus* (13 males, two females) on birds arriving from Portugal. Among this group, only the ostrich louse fly (*S. struthionis*) is restricted to ostriches. The others, all adult ixodid ticks, typically parasitize large herbivores of various sorts, although *A. lepidum* and especially *R. turanicus* seem to favor ostriches among their wild hosts; the latter species was by far the most numerous parasite identified. The sex ratio of the 154 submitted ticks was 10 males to one female, probably because of lengthy transit times and the tendency of males to remain on the host long-term, while females mate, feed, and drop off.

As a result of the interceptions of these exotic arthropod parasites entering the United States on imported ostriches, the U.S. Department of Agriculture (USDA) (Animal and Plant Health Inspection Service, Veterinary Services, Washington D.C., USA) as of 15 August 1989 prohibited any further importation of flightless birds (ratites), including cassowaries, emus, ostriches, and rheas (USDA APHIS VS, 1989). Such action was deemed necessary to prevent the introduction and spread of exotic ticks that are capable of vectoring a variety of disease organisms. The most important of these diseases are heartwater and East Coast fever, but the intercepted group of ticks includes species that are also known vectors of organisms causing Nairobi sheep disease; Q fever; babesioses of cattle, dogs, sheep, swine, and horses; Crimean-Congo hemorrhagic fever; epidemic typhus; Kenya tick typhus; and a wide variety of other viral, rickettsial, and bacterial infections. This interim prohibition was subject to public comment and modification or rescission. On 30 May 1990 the USDA modified its rules regarding the importation of ostriches and other ratites in order to allow restricted entry of certified parasite-and-disease-free chicks and hatching eggs (USDA APHIS VS, 1990).

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