

# Advanced Diagnostic Approaches and Current Management of Proventricular Dilatation Disease

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## KEYWORDS

- Proventricular dilatation disease • Avian borna virus
- Management • Diagnosis

Proventricular dilatation disease (PDD; synonyms: proventricular dilatation syndrome, macaw wasting/fading syndrome, neuropathic gastric dilatation of Psittaciformes, psittacine encephalomyelitis, myenteric ganglioneuritis, infiltrative splanchnic neuropathy) is a fatal inflammatory disease that affects mainly, but not exclusively, psittacine birds (Order: Psittaciformes). The disease was first recognized in the 1970s in imported macaws (*Ara* sp) in Europe and North America,<sup>1-7</sup> but has since been reported from Australia,<sup>8,9</sup> the Middle East,<sup>10-12</sup> and South America.<sup>13</sup> PDD is also present in South Africa (Dr Emily Lane, BVSC, MPHIL, MRCVS, DACVP, personal communication, 2009).

PDD has been reported in more than 70 psittacine species.<sup>6,14-16</sup> These species include members of the most well-known parrot genera in both the Psittacidae and Cacatuidae families, such as macaws (*Ara* sp), African gray parrots (*Psittacus erithacus*), cockatoos (*Cacatua* sp), Amazon parrots (*Amazona* sp), conures (eg, *Aratinga* sp), and cockatiels (*Nymphicus hollandicus*) (Table 1). PDD has not been reported in the budgerigar (*Melopsittacus undulatus*), which may be resistant to the disease.<sup>15,16</sup>

In addition to Psittaciformes, pathologic findings identical to those seen in PDD have been reported in several captive and free-ranging birds representing at least 5

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**Table 1**  
**Psittacine species that have been diagnosed with PDD<sup>a</sup>**

Genus	Species	Origin
Family: Cacatuidae		
<i>Nymphicus</i>	<i>hollandicus</i>	A/P
<i>Cacatua</i>	<i>alba, ducrops, galerita, goffini, haematuropygia, moluccensis, sanguine, sulphurea</i>	A/P
<i>Eolophus</i>	<i>roseicapillus</i>	A/P
<i>Calyptorhynchus</i>	<i>magnificus</i>	A/P
<i>Probosciger</i>	<i>atterimus</i>	A/P
Family: Psittacidae		
<i>Psittacula</i>	<i>alexandri, derbiana, eupatria, krameri</i>	A/P
<i>Eclectus</i>	<i>roratus</i>	A/P
<i>Trichoglossus</i>	<i>haematodus</i>	A/P
<i>Ara</i>	<i>ararauna, auricollis, chloroptera, glaucularis, macao, maracan, militarisa, nobilis, rubrogenys, severa, (+hybrids)</i>	AM
<i>Anodorhynchus</i>	<i>hyacinthinus</i>	AM
<i>Cyanopsitta</i>	<i>spixii</i>	AM
<i>Aratinga</i>	<i>acuticaudata, aurea, auricapilla, erythrocythra, finschi, guarouba, jandaya, solstitialis, weddellii</i>	AM
<i>Nandayus</i>	<i>nenday</i>	AM
<i>Cyanoliseus</i>	<i>patagonus</i>	AM
<i>Pyrrhura</i>	<i>molinae, rupicola</i>	AM
<i>Brotogeris</i>	<i>pyrrhopterus</i>	AM
<i>Rhynchopsitta</i>	<i>pachyrhynca</i>	AM
<i>Amazona</i>	<i>aestiva, albifrons, amazonica, auropalliata, autumnalis, leucocephala, ochrocephala, tucumana, xantholora</i>	AM
<i>Pionopsitta</i>	<i>pileata</i>	AM
<i>Pionus</i>	<i>chalcopterus, fuscus, mestrus, senilis</i>	AM
<i>Pionetes</i>	<i>leucogaster, melanocephala</i>	AM
<i>Derophtus</i>	<i>accipitrinus</i>	AM
<i>Forpus</i>	<i>coelestris</i>	AM
<i>Psittacus</i>	<i>erithacus</i>	AF
<i>Poicephalus</i>	<i>guliemi, meyeri, rufiventris, senegatus</i>	AF
<i>Coracopsis</i>	<i>vasa</i>	AF
<i>Agaporis</i>	<i>personata, roseicollia</i>	AF

Abbreviations: AF, African; AM, American; A/P, Asian/Pacific.

<sup>a</sup> Based on published<sup>6,14-16</sup> and unpublished data of S. Clubb and H.L. Shivaprasad, 1980-2010.

additional orders. These birds include canaries (*Serinus canaria*, order: Passeriformes), greenfinches (*Carduelis chloris*, order: Passeriformes), long-wattled umbrella birds (*Cephalopterus penduliger*, order: Passeriformes), Canada geese (*Branta canadensis*, order: Anseriformes), roseate spoonbills (*Ajaja ajaja*, order: Pelecaniformes), peregrine falcons (*Falco peregrinus*, order: Falconiformes), toucans (*Ramphastos* sp, order: Piciformes), and bearded barbets (*Lybius dubius*, order: Piciformes).<sup>7,17-20</sup>

Based on the occurrence of case clusters, PDD has been long considered an infectious disease<sup>5</sup>; however, under most circumstances the disease seems to spread