

# Phylogenetic relationships of cockatoos (Aves: Psittaciformes) based on DNA sequences of the seventh intron of nuclear $\beta$ -fibrinogen gene

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Cockatoos are belonged to  
 order : Psittaciformes,  
 family : Psittacidae (Forshaw, 1989)  
 subfamily: Cacatuidae (del Hoyo, 1998)  
 tribes : Calopsittacini  
 Chalyptorhynchini  
 Cacatuini

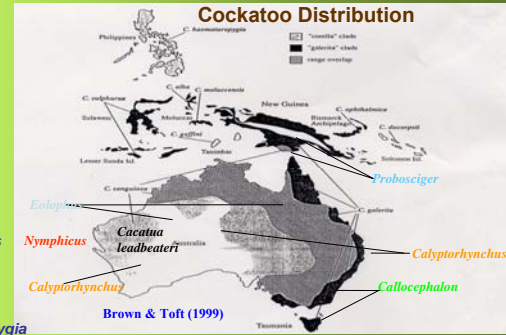
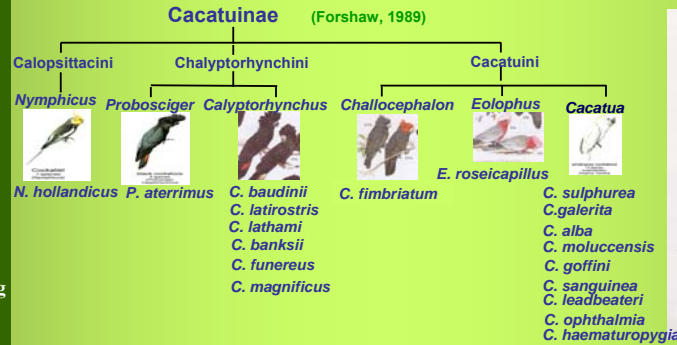
In the world, there are six extant genera consisting of 21 cockatoo species

Some previous authors have made grouping and evolutionary relationships of cockatoos based on morphological characters, isozyme, and mitochondrial DNA. However, their relationships are still controversial, especially concerning the position of *Nymphicus hollandicus*. Since the nuclear  $\beta$ -fibrinogen gene has been recognized useful for phylogenetic studies of some birds, this study employed the DNA sequence of seventh intron of this gene (fibint7) to construct phylogenetic relationships of cockatoos based on neighbor-joining (NJ) and maximum-parsimony (MP) methods

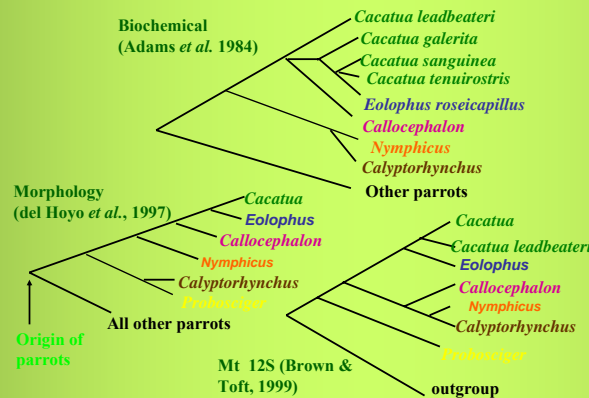
Unlike previous studies, DNA sequence data from nuclear  $\beta$ -fibrinogen gene (Fibint7) of six cockatoo genera were analyzed in this study

### Objectives of this study

- To resolve the phylogenetic relationships within cockatoos (Cacatuinae phylogeny)
- To determine the position of cockatiel (*Nymphicus*)
- To determine the monophyly or paraphyly of each tribe
- To determine whether or not the phylogeny inferred from Fibint7 reflects biogeography of the cockatoos



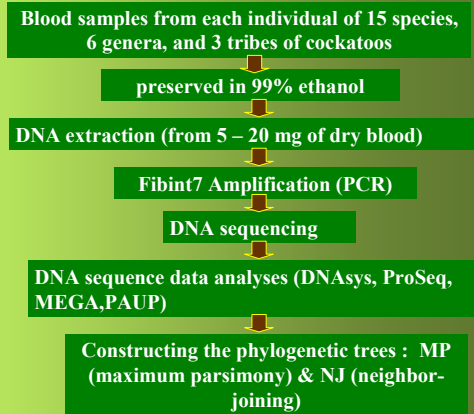
### Phylogeny based on different characters



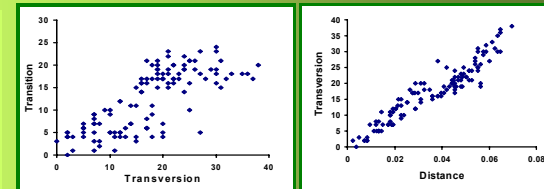
### Sequence Characteristics of fibint7 on Cockatoos

Length of indels	: 1 – 9 bp
No. of nucleotide	: 808 – 817 bp
Variable sites	: 310
Informative sites	: 164

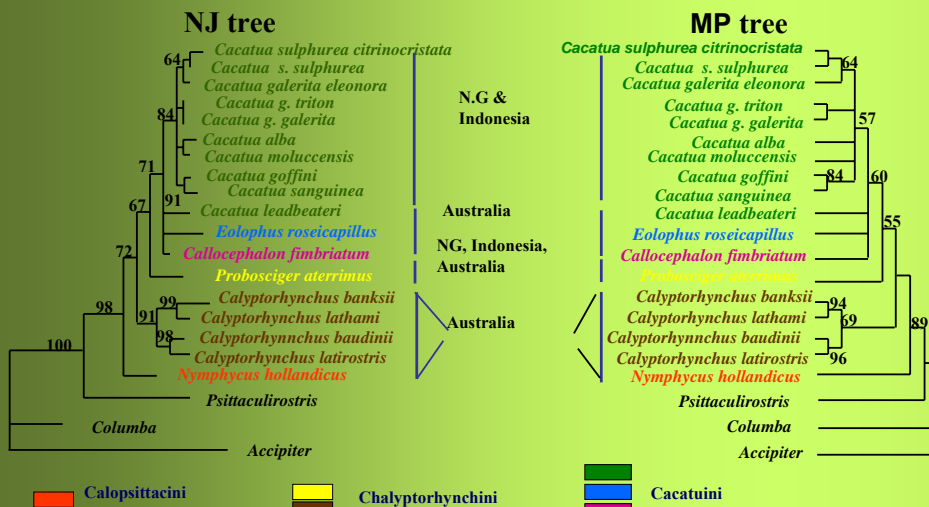
### MATERIALS AND METHODS



### Saturation analyses



### Phylogenetic trees of cockatoos based on fibint7 of $\beta$ -fibrinogen gene



### CONCLUSION

- Relationships between species of genus *Cacatua* were not well resolved by Fibint7 gene sequence.
- Cacatua leadbeateri* was relatively distant from congeneric species
- Tribe Cacatuini (*Cacatua*, *Eolophus* and *Calcocephalon*) was monophyletic
- Tribe Chalyptorhynchini (*Calyptorhynchus* and *Probosciger*) was paraphyletic
- Nymphicus* probably a basal clade of cockatoos
- Phylogeny inferred from Fibint7 sequences reflects biogeography of cockatoos. Probably, cockatoos came from Australia and spread to Pacific region, including N.G and Indonesian Archipelago

### ACKNOWLEDGEMENT

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