



บทความวิชาการ คณะเทคโนโลยีการเกษตร



FACULTY OF AGRICULTURAL TECHNOLOGY

ปีที่ 2 ฉบับที่ 2

Bird Sexing

Why do most species of birds need DNA testing to determine their gender?

With most species of birds the male and female look exactly the same and the only way to determine the sex of the bird is through DNA sexing or through the technique of endoscopy. The sexing of birds by DNA has an accuracy rate of 99.9% and doesn't cause stress or injury to the bird. With only a few feathers or drops of blood a laboratory can perform the test and give you accurate results.

How is the sex of a bird determined by DNA?

A bird's sex is determined by Z and W sex chromosomes. Just like in humans and in other mammals that have the X and Y chromosomes. In birds males carry two Z chromosomes (ZZ), and females carry a W chromosome and a Z chromosome (ZW). It encodes the chromodomain helicase DNA binding protein and is located probably in both chromosomes in almost all bird species except ratites, which have undifferentiated sex chromosomes (Griffiths *et al.*, 1996).

What technique is used to conduct the DNA test?

The technique that is used to process the DNA sample is called PCR (polymerase chain reaction) and agarose gel electrophoresis. PCR is one of the most advanced techniques of molecular biology. With PCR it is possible to amplify a single piece of DNA and to magnify it to generate millions or more copies of the DNA piece. Agarose gel electrophoresis is a method used in

molecular biology to separate DNA molecules by size (Anna and Magdalena, 2006).

What type of sample is used to determine the sex of a bird?

DNA sexing can be performed with blood, feather or an eggshell sample. Both blood and feather samples contain the birds DNA and provide the same amount of accuracy.



How old does a bird need to be tested?

The bird can be tested as soon as 7 days after hatching. However, at this age the bird doesn't have any feathers to be tested. In order to sex the bird at this age we would need a blood sample.



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How many feathers are needed to complete the test?

6-8 Chest feathers are needed.

What kinds of feathers have a better tissue sample for the DNA test?

Chest feathers are great for DNA testing since they are dry bulb feathers and don't cause as much stress to the bird as blood feathers do.

Can molted feathers be used for the test?

No, only freshly plucked feathers can be used. Molted feathers don't contain enough tissue DNA to complete the test.

Type of scientific sexing required birds



Blue and Gold Macaw



African Grey Parrot



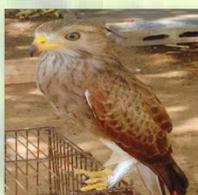
Crimson (Pennant) Rosella



Maroon-bellied Conure



Masked Lovebird



Hawk

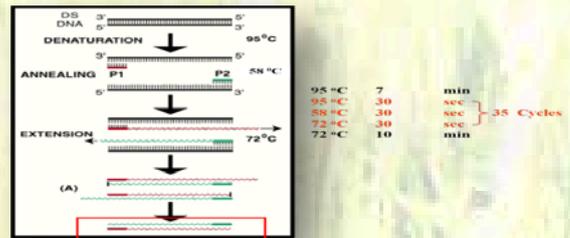
Sources: Anonymous (2010)

Materials and Methods

Blood or feather preparation

DNA extraction by the acid phenol extraction method
(Chomczynsky *et al.*, 1987)

Specific DNA amplification by PCR technique Using Chromo-Helicase-DNA-Binding protein (CHD-related primer)



Agarose gel electrophoresis

Results



References

- Anna, D. and Magdalena, Z.N. 2006. Molecular techniques for Identification in birds. *Biological let*, 13(1): 1-12.
- Anonymous. 2010. Bird sexing. Online available: <http://www.unclemikespetworld.ie/pages/birds.html>.
- Chomczynsky, P. and Sacchi, N. 1987. Single-step method of RNA isolation by acid guanidinium thiocyanate-phenol-chloroform extraction. *Anal. Biochem.* 162, 156-159.
- Griffiths R., Daan, S., Dijkstra, C. 1996. Sex identification in birds using two CHD genes. *Proc. Royal Soc. London B* 263:1251-1256.