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Establishing Optimal Conditions for Artificial Incubation of Cockatiel Eggs

(*Nymphicus hollandicus*)

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Efforts to increase the efficiency of reproduction in companion birds most frequently involves artificial incubation. We decided to determine the incubation conditions suitable for one of the most common companion birds, the cockatiel (*Nymphicus hollandicus*).

There is extensive literature on the factors important in successful incubation of domestic poultry and game birds. We decided to test several of these in cockatiels, including length of time that eggs can be held prior to incubation, temperature and humidity during holding and incubation and hatching temperatures. Here we report on a study of incubation temperature, which establishes that cockatiels develop and hatch normally under temperature and humidity conditions found optimal for domestic poultry and game birds.

A breeding colony of 65 pairs of cockatiels provided the eggs for the study. Each pair of cockatiels occupied a single cage. They were fed *ad libitum* with a breeder crumble diet (Roudybush et al., 1984).

Eggs were collected daily and marked by hen I.D. number and the date laid. They were fumigated and stored for not more than three days in a cold room maintained at 12.8°C and 60% relative humidity (Cutler et al., 1985).

In this study we compared three temperature regimes. The standard temperature for chickens and most other domestic or game species was used in one group, considered the control. Temperatures 1.4°C above and below this level were compared with this standard.

Prior to setting, eggs from each pair were distributed equally into the three temperature groups. Egg weights were obtained shortly after lay, at the time of setting, and at the time of transfer to the hatcher. Hatched chicks were also weighed.

Eggs were incubated in Jamesway 252 incubators. They were set aircell end up, in trays fitted with special inserts to accommodate the small cockatiel eggs. The trays automatically turned every two hours.

Incubation temperatures for the control and the two treatment groups were 37.5°C (control), 38.9°C and 36.1°C. Humidity was adjusted to provide a relative humidity of 56 percent in all groups.

At seven days of incubation, the eggs were candled and all infertile and early dead embryos were removed and examined for abnormalities. At 15 days, the eggs were candled and any additional dead embryos were removed and examined.

In each case, eggs appearing infertile or dead by candling test were removed and broken out. Dead embryos were staged and all abnormalities recorded. Living normal embryos were transferred to hatching incubators, in this case a Lyon's Glass Top set at 36.9°C, 38.3°C and 35.6°C. Relative humidity during hatching was increased to 67 percent. Eggs were not turned after transfer to the hatching machine.

The time of onset of pipping and hatching was recorded. Unhatched eggs were kept in the hatcher for several extra days to permit chicks in the slow developing treatment group to emerge. Infertile eggs, age at death, embryonic abnormalities, and chick defects were recorded.

Fertility was high and satisfactory in the control and both treatment groups. The control group hatched at 81.0% and required a total of 18 days of incubation. Relatively slight adjustment up or down in temperature reduced hatchability drastically (see Table 1).

Only 32.0% of the high temperature group hatched, with most of the embryonic mortality occurring during the final mortality peak. High

Table 1

Cockatiel fertility, hatchability and time required to complete development at three incubation temperatures

Incubation temperature	37.5°C	38.9°C	36.1°C
No. of eggs set	126	129	128
No. of fertile eggs	113	113	112
Fertility (%)	89.0	87.0	87.0
Hatchability (%)	81.0	32.0	58.0
Time (days) from setting to pipping	16	15	18
Time (days) from setting to hatching	18	17	20

temperature embryos had abnormalities of the eye, beak, and brain. Poor umbilical seals were observed in 16% of the chicks from this treatment group. The total length of incubation was about 24 hours less than that of the control group. Egg weight loss during incubation was 9.8% and chick weights were lower than those of the control group (see Table 2).

Table 2

Weight loss in cockatiel eggs during incubation at three temperatures

Incubation temperature	37.5°C	38.9°C	36.1°C
Average weights (g)			
at lay	5.84	5.80	5.82
at setting	5.83	5.79	5.81
at 15 days of incubation	5.28	5.23	5.31
chick	4.08	3.81	3.98
egg shell	0.37	0.38	0.37
Egg weight at transfer			
actual weight loss	0.54	0.56	0.51
as percent of initial egg weight	9.35	9.80	8.78
Chick weight			
actual weight loss	1.75	1.98	1.83
as percent of initial egg weight	29.95	34.23	31.55

Hatchability of eggs in the low temperature group was 58.0 percent. Two extra days of incubation were required. Embryonic abnormalities again included eye, beak and brain defects. Twenty percent of the chicks in this treatment group had poor umbilical seals. Egg weight loss from set to transfer was 8.78%. Chick weights were greater than those from the high temperature but not as high as the control group.

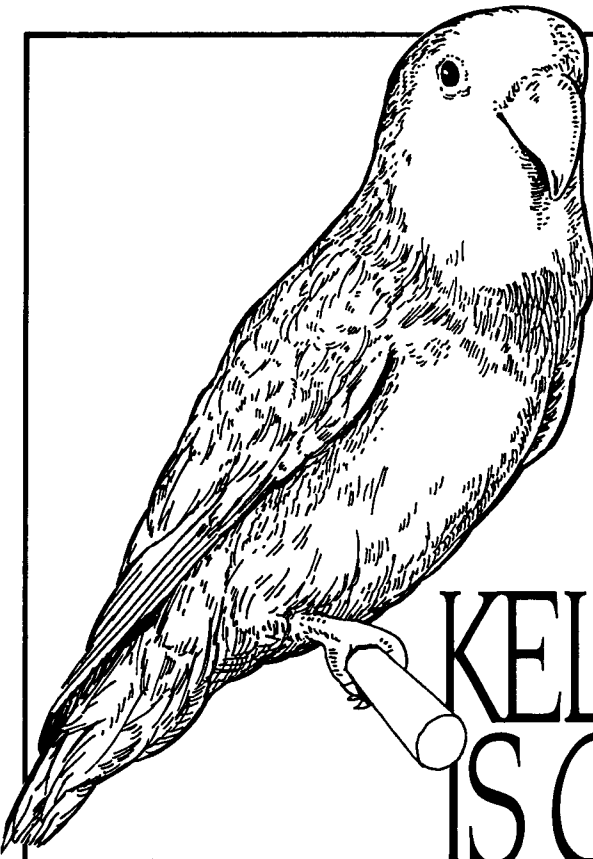
Cockatiel eggs may be successfully incubated under conditions standard

for domestic poultry and game birds. A constant incubation temperature of 37.5°C with 56 percent relative humidity, combined with a hatching temperature at 36.9°C with 67 percent relative humidity gave 81 percent hatch of fertile eggs. Increasing or decreasing the temperature by 1.4°C gave very poor hatchability and increased the coincidence of abnormalities and of cull chicks. The higher temperature was more detri-

mental than the lower temperature. In this respect as well, cockatiels resemble other well-studied avian species.

References

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