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Evaluation of an additional water supply in pekin ducks (Anas platyrhynchos f. d.)

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The project was supported by funds of the Ministry for Food, Agriculture and Consumer Protection, Lower Saxony

Niedersächsisches Ministerium
für Ernährung, Landwirtschaft
und Verbraucherschutz

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EAAP - Warsaw 2015

Background

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Biological requirements

Water associated behaviour (examples)

→ Drinking

→ Straining

→ Bathing, Preening

→ Cleaning of beak and nostrils

Figure 1: Lamellae at the beak of a pekin duck

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Nipple drinkers

Fattening period

Usage of nipple drinkers

→ Hygienic supply of drinking water

→ Quality of litter

→Addition of moisture into the litter

Nipple drinkers → Contrary to the behavioural requirements of ducks

Figure 2: Nipple drinkers

EC-Recommendations

Recommendations of the Standing Committee of the European convention for the Protection of Animals kept for farming purpose – Recommendations concerning domestic ducks (1999)

(Article 11, number 2)

<u>Access to bathing water</u>

→Fulfilment of the biological requirements of ducks

EC-Recommendations

Pekin ducks without access to bathing water:

Presence of water resources sufficient in number and designed to allow

1. to cover the head with water
2. to take in water by the beak
3. to shake water over the bodies without difficulty
4. to dip their heads under water

Prototype of a modified cup drinker system

Aim of the study:

Evaluation of the suitability of a modified cup drinker system to fulfil the requirements of EC-Recommendations

Figure 3 : Prototype of modified cup drinker system. Manufacturer: Big Dutchman, Lubing

Materials and methods

Feasibility study

Main issues to be clarified

- Adherence of food-colouring on skin and feathers?
- Acceptance of blue-coloured water?
- Reliability of colouring?

- **Results:**
- Blue coloured water → Accepted by ducks
- BASF patent blue 85 (E 131) → adhesive on skin and feathers
- Colouring indicates use of cup drinker system

Experimental setup

- 16 experimental compartments á 10 m²
- 284 pekin ducks

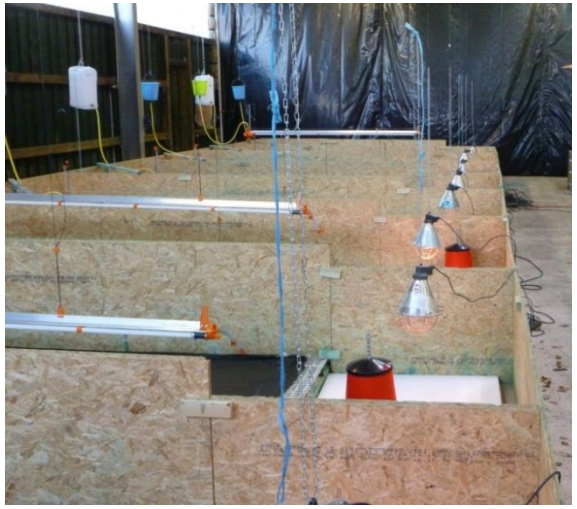

Figure 4: Experimental compartments

- Variants
  a. Nipple drinkers
  b. Modified cup drinker
  c. Compartment for video recording (transparent prototype)

Figure 5: Compartment for video recording

Experimental setup

Implementation (n= 126 ducks)

- Test at day 30, 37 and 44 of age
- 42 ducks per date

Rearing

↓

Experimental compartment
90 Min. with coloured water

↓

Scoring integument

↓

fattening phase

Figure 6: Prototype with blue-coloured water (E 131)

Collected data

- Scoring of head and integument
- Feed consumption
- Water usage
- Body weight development

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Scoring scheme

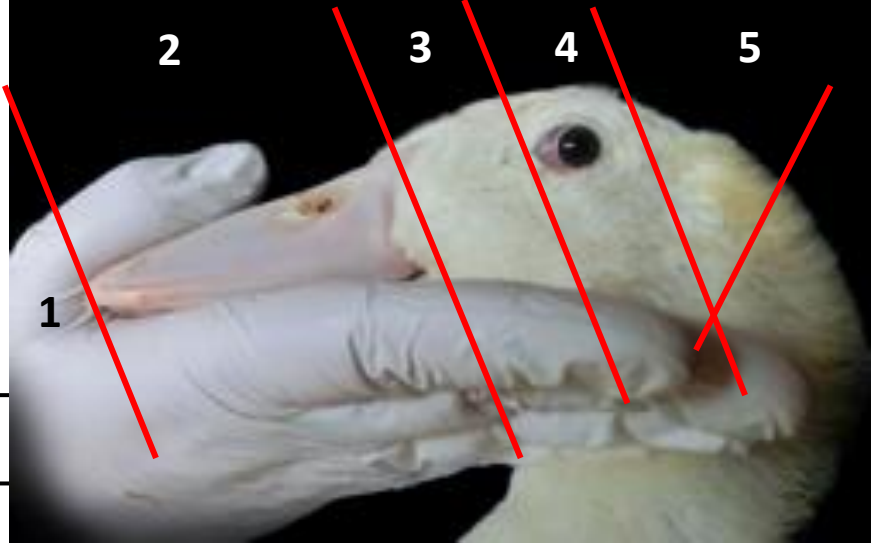

Figure 7: Scoring of the head

Table 2: Scoring scheme of the head

Body region	Score	Attribute of scores
Head	1	No visible colouring
	2	Beak and nostrils coloured
	3	Colouring ends in front of eyes
	4	Colouring ends behind eyes
	5	Colouring ends at first cervical vertebra

Scoring scheme

Table 3: Scoring scheme of body regions

Body region	Score	Attribute of scores
Uropygial gland Dorsal area between wings Crop Flank	1	No visible colouring
	2	Partially colouring, at least one non-coloured area (>1cm^2)
	3	Almost complete colouring of body region (non-coloured areas <1cm^2)

Hypotheses

Evaluation of the modified cup drinker system under controlled conditions

2 hypotheses were tested:

The prototype enables ducks up to 44 days of age

- A) to cover their heads with water
- B) to splash water over their bodies

Statistical analyses

Chi-Square procedure

Expected value was tested versus observed value

H0 = No difference between observed and expected value

H1 = Difference between observed and expected value

Results

Scoring head

Table 4: Observed frequency distributions regarding scoring of head (n= 125)

Body region	Score				
	1	2	3	4	5
Head	0	0	0	0	125

Figure 8 and 9: Ducks during 90 minutes contact with blue-coloured water (E 131)

Scoring head

The modified cup drinker enables ducks to cover their heads with water.

→Hypothesis A is confirmed ($p < 0.001$, Chi-Square)

Figure 10: Duck covers head with water


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Scoring body regions

Table 5: Observed vs. expected frequency distribution regarding scoring of body regions (n= 125)

	Scoring	Limit value	Observed values	Expected values	Chi²
Uropygial gland	1	10 %	**1**	12	11.15
	2, 3	90 %	**124**	113	
Dorsal area between wings	1	10 %	**0**	12	13.27
	2, 3	90 %	**125**	113	
Crop	1	10 %	**0**	12	13.27
	2, 3	90 %	**125**	113	
Flank	1	10 %	**0**	12	13.27
	2, 3	90 %	**125**	113	

Limit value at 1 DF and 0.1 % confidence level: 10.83

Scoring body regions

The modified cup drinker allows ducks to splash water over their bodies.

→Hypothesis B is confirmed ($p < 0.001$, Chi-Square)

Figure 11 - 13: Ducks with blue coloured integument

Results

Table 6: Mean body weight (± SD) at day 30, 37 and 44

	30 days of age n=42	37 days of age n=42	44 days of age n=41
Ø Body weight (kg/ duck)	2.3 (± 0.2)	3.0 (± 0.3)	3.5 (± 0.3)

Table 7: Water usage and feed consumption at day 25 – 44

	Modified cup drinker			Nipple drinkers		
Compartment	1	2	3	1	2	3
Water usage l/ duck cumulated	26.6	28.1	28.3	11.5	11.5	12.0
Feed consumption kg/ duck cumulated	4.7	5.3	4.9	5.0	5.5	5.1

Conclusions

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Prototype of a modified cup drinker

→ Fulfils the requirements of EC-Recommendations (1999) (article 11, number 2) for pekin ducks under controlled conditions

→ Ducks have the opportunity dip their head an splash their feathers

→ Economic and hygienic aspects have to be taken into account

For final evaluation: study under field conditions is needed

Figure 14:
Prototype of a
modified cup drinker

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Acknowledgements

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und Verbraucherschutz

Acknowledgements for technical and scientific support:

Big Dutchman

Big Dutchman AG,
Vechta

LUBING

Lubing Maschinenfabrik
GmbH & Co. KG, Barnstorf

Thank you for your attention!

Experimental setup

Table 1: Experimental setup

Groups (n)	Technique	Purpose	Ducks (n)
3	Modified cup drinker	First fattening	126
3	Blue coloured drinking water	Scoring of head and body regions	126
3	Modified cup drinker	Fattening phase of scored ducks	126
1	Transparent prototype	Video recording	6
3	Nipple drinkers	Recording feed and water consumption	66
3	Modified cup drinker	Recording feed and water consumption	66