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Effects of two different watering tray types on the behaviour of geese

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ABSTRACT

For the development of rearing and laying technologies under intensive conditions the examination of the behaviour of geese is of great importance. Feeding, drinking, resting, preening, playing and social behaviour types were examined with two different watering tray types (free flow and ventile). On comparison of the results obtained with those presented in the literature it could be established that changes in comfort behaviour types in geese in the first 6 weeks are similar to those observed in Pekin, Muscovy and mulard ducks. Differences were found in the frequency of occurrence of the various behavioural forms. The decrease observed in feeding, drinking and playing time and the higher proportion of resting time inform us that activity in geese is lower than in ducks in the first weeks of rearing. In accordance with the results of the experiment it may be suggested that ventile watering trays be used for geese, as is already the practice with ducks. The introduction of this watering method could help to minimise the extent of feed and water wastage, since it induces the feed searching behaviour pattern. Lack of this behaviour, as is common with intensively kept geese, causes boredom resulting in behavioural anomalies.
(Keywords: geese, behaviour, watering tray type)

ZUSAMMENFASSUNG

Einfluβ von zwei verschiedenen Tränketypen auf das Verhalten von Gänsen
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Zur Entwicklung einer intensiven Haltungsmethode für Gänse hat die Erfassung der Verhaltensformen eine groβe Bedeutung. In unseren Untersuchungen, bei der zwei verschiedene Tränken - die herkömmliche Trogtränke und die Nippeltränke - verwendet wurden, haben wir folgende Verhaltensformen unterschieden: Fressen, Trink-, Ruhe-, Spiel-, Putz-, und Sozialverhalten. Beim Vergleich unserer Ergebnisse mit denen der Fachliteratur konnte festgestellt werden, daβ das Verhalten der Gänse in der ersten sechs Lebenswochen dem der Peking-, Flug-, und Mulard Enten sehr ähnlich ist. Unterschiede konnten in der prozentualen Häufigkeit der einzelnen Verhaltensformen beobachtet werden. Beachtet man die Unterschiede im Fressen, Trinken und Spielen und die längeren Ruhezeiten, kann man schlussfolgern, daβ die Gänse in den ersten sechs

Lebenswochen weniger aktiv sind als Enten. Laut unseren Forschungen kann es sinnvoll sein, die bei Enten schon bewährten Nippeltränken zu verwenden. Deren Benutzung könnte die Futter- und Trinkwasserverluste reduzieren, denn diese lösen das Weideverhalten aus, aber infolge des Weidemangels können in der Intensivhaltung durch Langeweile und das daraus resultierende Verhalten Anomalien auftreten.
(Schlüsselwörter: Gänse, Verhalten, verschiedene Tränketypen)

INTRODUCTION

During intensive animal production various factors are prerequisite regardless of seasonal changes. To achieve optimal circumstances it is of crucial importance to study the behavioural response of geese to the conditions provided.

This experiment was aimed, on one hand, at mapping the basic activities of the goose within closed, intensive keeping conditions, based on literature data relating to other types of fowl (Muscovy and Pekin duck), and on the other hand at studying the effects of two different watering tray types (free flow and ventile) on the behavioural patterns of the goose.

MATERIALS AND METHODS

The experimental group for the ethological study was taken from Grey Landes goose stock of the Pannon University of Agriculture Experimental and Study Farm. Ten birds of each sex were placed in each of 18 boxes in a random block arrangement. Two watering tray types were divided evenly between the boxes. The experimental stock was reared under closed, intensive conditions following common nurturing and feeding technology. The experiment and the observations were conducted in accordance with recent studies on ducks (*Reiter et al*., 1995) and with our previous experiments (*Molnár et al*., 1998).

Observations were made in 6 of the 18 boxes, representing 3 boxes per watering tray type. Video recordings were made of the behaviour of the birds 3 times a week, these lasting one hour per box.

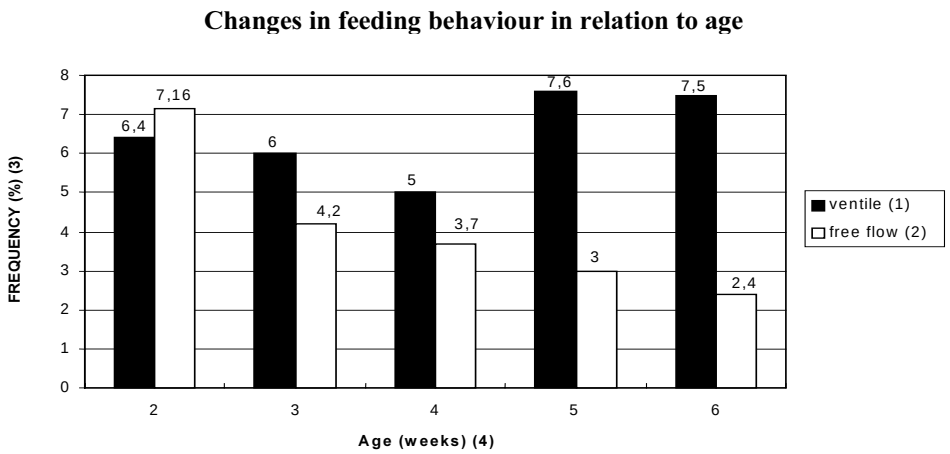
During analysis of the tapes data for further analysis were taken in one minute intervals. Six behaviour patterns – feeding, drinking, resting, social behaviour, preening and playing – were observed on the tapes, to determine in practical terms their presence or absence at a given moment and also their frequency, i.e. how many of the 10 birds showed the given behaviour at that time. Behaviour terms were standardised by use of the relevant entries in the Lexicon of Ethology (*Czakó,* 1985). Statistical analysis was performed by χ^2 test and percentage rate.

RESULTS AND DISCUSSION

The main points of the results obtained can be listed as follows.
During intensive keeping all the 6 behaviour patterns changed with advancing age in the case of both watering tray types.

Time taken up by *feeding* and its frequency (*Fig. 1*) decreased where the free flow watering tray was used, with a significant ($p \leq 0.05$) value between weeks 2 and 3. It decreased by 4.5% during the experimental period, calculated on the basis of total frequency. Where the ventile watering tray was used the frequency also decreased until week 4 but during weeks 5-6 it suddenly showed a significant ($p \leq 0.05$) upswing, reaching 7.5-7.6%, which exceeded even the initial value of 6.4%.

Figure 1

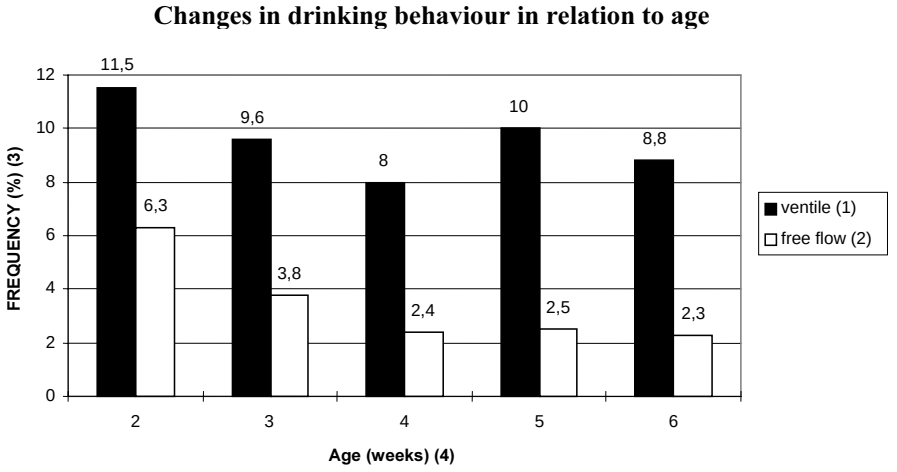


1. Abbildung: Das Fressverhalten in den verschiedenen Lebenswochen

Nippeltränke(1), Trogtränke(2), Häufigkeit des Verhaltens(3), Lebenswochen(4)

Frequency of occurrence of *drinking* behaviour (*Fig. 2*) followed the pattern shown above. Significant difference ($p \leq 0.05$) was observed with the free flow watering tray in weeks 2-3 and 3-4. Total reduction in drinking frequency was 4% during the experimental period. Where the ventile watering tray was used a significant upswing occurred after week 4.

Figure 2



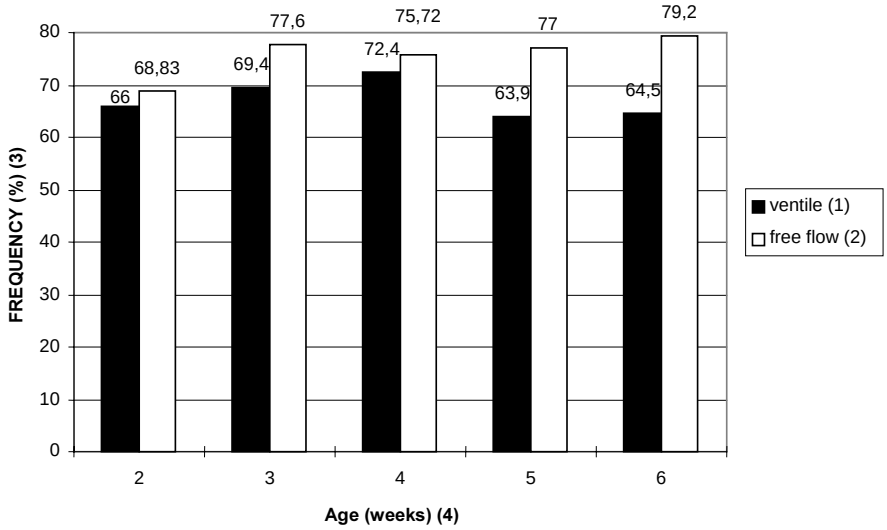
2. Abbildung: Das Trinkverhalten in den verschiedenen Lebenswochen

Nippeltränke(1), Trogtränke(2), Häufigkeit des Verhaltens(3), Lebenswochen(4)

Resting frequency (*Fig. 3*) turned out to be the opposite of the two previous patterns. Where the free flow watering tray was used the frequency of resting increased from the initial value of 68.8% to 79.2%. Between weeks 2 and 3 significant difference ($p \leq 0.05$) was found between the data. The resting rate increased until week 4 where the ventile watering tray was used (66% and 72.4%), followed by a considerable drop (63.9-64%). Differences showed significance ($p \leq 0.05$) between weeks 2-3, 3-4 and 4-5.

Figure 3

Changes in resting behaviour in relation to age



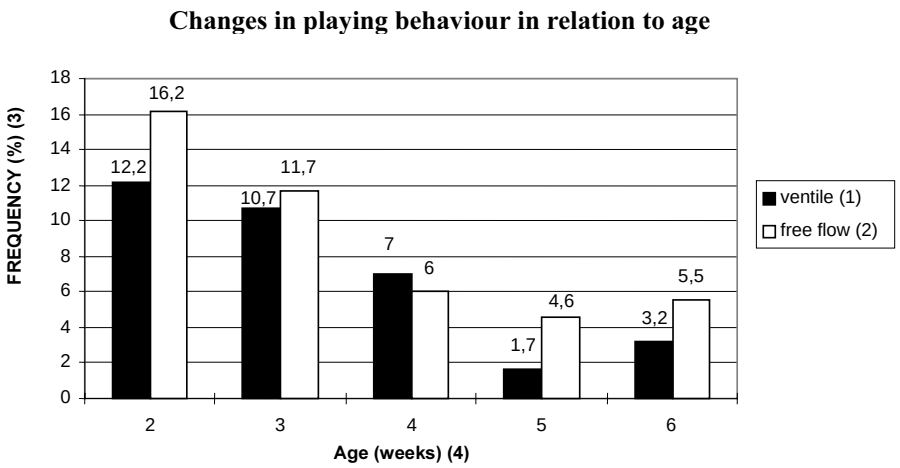
3. Abbildung: Das Ruheverhalten in den verschiedenen Lebenswochen

Nippeltränke(1), Trogtränke(2), Häufigkeit des Verhaltens(3), Lebenswochen(4)

Playing frequency showed a similar pattern with the geese using both types of watering tray (*Fig. 4*). It decreased steadily up to week 5, then began to rise in both cases but failed to reach the original value. Statistical analysis showed significant differences ($p \leq 0.05$) in all instances.

As can be seen in *Fig. 5*, where the free flow watering trays were used the occurrence of *social* behaviour remained below the frequency of the other behaviour patterns throughout the experimental period (at 0.4-0.7%), except for an upswing between weeks 4 and 5 (1.5%) followed by a drop back to the initial value. The difference was significant ($p \leq 0.05$). In the other group the increase began in week 4, but a real upswing (reaching 6.2%) could be observed in week 5, also followed by a drop back to the initial value of 0.6-0.7%. Changes were also significant at $p \leq 0.05$ level.

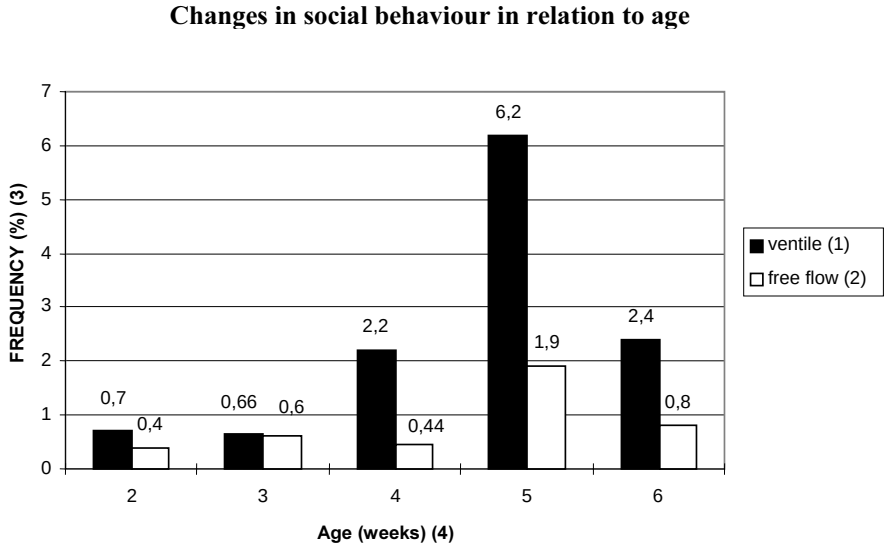
Figure 4



4. Abbildung: Das Spielverhalten in den verschiedenen Lebenswochen

Nippeltränke(1), Trogtränke(2), Häufigkeit des Verhaltens(3), Lebenswochen(4)

Figure 5



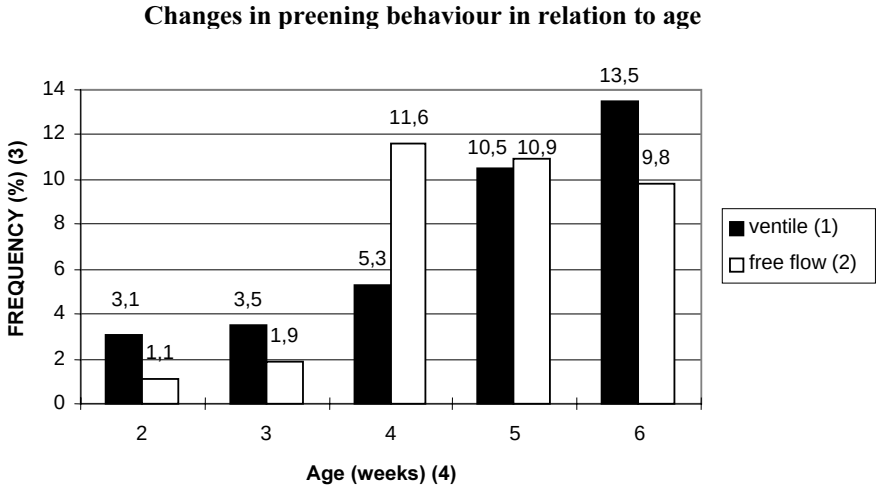
5. Abbildung: Das Sozialverhalten in den verschiedenen Lebenswochen

Nippeltränke(1), Trogtränke(2), Häufigkeit des Verhaltens(3), Lebenswochen(4)

In the *preening* behaviour pattern (*Fig. 6*) a peak was apparent in week 4. Before the peak this type of behaviour could be hardly detected, and low frequency values were

also recorded after the peak. In the groups with the ventile watering tray this peak failed to appear but frequency of occurrence increased steadily until week 6. This increment was significant ($p \leq 0.05$) between weeks 3-4, 4-5 and 5-6.

Figure 6



6. Abbildung: DasPutzverhalten in den verschiedenen Lebenswochen

Nippeltränke(1), Trogtränke(2), Häufigkeit des Verhaltens(3), Lebenswochen(4)

The effect on behaviour of the differences between the two types of drinking technology is indicated clearly by the fact that in most cases the resulting differences were significant at $p \leq 0.05$ level. In two instances, resting in week 2 and feeding in week 4, the values showed significance at $p \leq 0.1$ level. No significance of watering tray type effect could be verified in the following instances: playing in weeks 3-4, social behaviour in weeks 2-3, feeding in week 2 and preening in week 5.

Feeding occurrence rates were always higher after week 2 in groups with the ventile watering tray, in week 6 exceeding 3 times the frequency values recorded for the groups with free flow watering trays.

Drinking showed a more emphasised of the above pattern: where the ventile watering tray was used the frequency of this type of behaviour proved higher as early as week 2, and by week 5 the respective values were 4 times higher than those of the other group. In accordance with the above, *resting* rates reached 13-15% higher values by weeks 5-6 in the group with free flow watering trays than in the others.

The frequency of *playing* with litter and other box furnishings was higher, while the occurrence of *social behaviour* patterns (greeting, threatening and aggression) was lower where the free flow watering tray was used. Frequency of *preening* behaviour showed smaller differences, but in the first occurrence greater differences: when the ventile watering trays were used the birds seemed to begin cleaning their feathers later.

In four of the 6 weeks of the experiment the *individual rates* of the various behaviour patterns were of a varying nature, while in weeks 5 and 6 their occurrence values were more steady.

The individual occurrence values for the different behaviour patterns within basic activity showed the following average composition in the groups with free flow watering trays: feeding 4.1%, drinking 3.6%, resting 75.6%, playing 8.8%, social behaviour 0.8% and preening 7.0%. The same values for the groups with ventile watering trays were 6.5%, 7.9%, 67.2%, 6.7%, 2.4% and 7.2%.

The above data show that feeding and drinking occurred more frequently in the groups with the ventile watering tray; hence, resting rate remained below that recorded in the group with the free flowing watering tray. Preening showed no considerable difference between the two groups. Playing rate was found to be lower in the group with the ventile watering tray than in the other group.

On comparison of these findings with those of experiments performed in Germany (*Reiter* and *Bessei*, 1995) it can be seen that in the first weeks of rearing the basic behaviour pattern of the goose is very close to the tendencies obtained from experiments with Pekin ducks, Muscovy ducks and mulard ducks. Differences are apparent in the percentage frequency rate distribution of the various behaviour patterns. In ducks the frequency of playing behaviour decreases from 12% to about 8%, while in the case of geese it can decrease from 12% to a frequency as low as 1.7%. This drop is the strongest in weeks 2 and 3. After week 2 the decrease slows down as the animal discovers its environment and learns other movements required by other behaviour patterns. This may also explain the observation that resting time begins to increase in weeks 2 and 3. Resting rate has been found tot increase from 35% to 50% in the case of ducks, but from 66-68% to 77-79% in the case of geese, indicating that the goose is less active during the first weeks of rearing than the duck.

Decrease in feeding and drinking rates during weeks 3 and 4 corresponds to the end of the first phase of the periodical growing pattern of the goose (*Bogenfürst*, 1992). This phenomenon can be explained both by the perfect learning of movement sequences and by the lengthening of the oesophagus, enabling the bird to take up more feed. However, where the ventile watering tray was used it could be observed that the birds would have been able to take up more feed, but the quantity of water which it was possible to drink on each occasion limited feed intake, and so the goose spent more time 'searching' for feed than did the goose in the groups with free flow watering trays. This means that time spent playing decreased, so the use of ventile watering trays could reduce the 'urge for destruction' caused mainly by boredom.

With respect to the social behaviour pattern the results for the ventile watering tray are not positive in every case, since they are higher than the corresponding values for the group with the other type of tray, but through special care (i.e., removing aggressive birds from the group) the average value of 2.3% could be maintained successfully during the nurturing period.

The peak in preening between weeks 3 and 4 indicates the effects of the first moulting, which entails a rather uncomfortable feeling for the birds. Full maturing of the feathers can be expected by weeks 8-10 (*Bögre and Bogenfürst*, 1971). Differences in time between the two watering types can also be explained by the presence or absence of boredom: bored birds play not only with the box furnishings but also with their own feathers and those of their groupmates, resulting in feather picking in extreme cases. Where ventile watering trays are used young geese do not overpreen; they occupy themselves with their feathers only as much as is really necessary. The latter result is also assisted by the fact that the birds can hardly 'take a bath' in the ventile watering tray, and thus the need to dry the feathers is eliminated, alongside the minimisation of water wastage.

CONCLUSIONS

In accordance with the results of the experiment described above it can be recommended that ventile watering trays be used for geese, as is already the practice with ducks. The introduction of this watering method could help in minimising the extent of feed and water wastage, since it induces the feed searching behaviour pattern. Lack of this behaviour, as is common with intensively kept geese, causes boredom, resulting in behavioural anomalies. Greater knowledge of the daily feeding and drinking rhythm of geese could also assist in the attainment of better understanding of the above phenomenon. (A new experiment is to be conducted to clarify these points.)

Due to the simultaneous appearance of preening and social patterns in weeks 4-5 special attention should be paid to the avoidance of any possible behavioural anomalies (i.e., feather picking and aggression), in order to eliminate their negative effects on the efficiency of goose production.

REFERENCES

Bogenfürst F. (1992). Lúdtenyésztők kézikönyve. Új Nap Könyvkiadó, Budapest.

Bögre J., Bogenfürst F. (1971). A 0-12 hetes növendékludak tollazatának testtájonkénti fejlődése és a fejlődés szakaszos jellege. Baromfiipar, 18. 3. 109-111.

Czakó J.(1985). Etológia kislexikon Natura kiadó, Budapest.

Molnár M., Molnár T., Bogenfürst F. (1998). A lúd néhány viselkedési formájának változása 2-7 hetes korig, intenzív tartási viszonyok között. Acta Agraria Kaposváriensis, 2.1. 49-56.

Reiter, K. (1991). Wie man Futter- und Wasserverluste reduziert. Deutsche Geflügelwirtschaft und Schweineproduktion, 927-930.

Reiter, K., Bessei,W. (1995). Behavioural comparison of Pekin, Muscovy and Mulard duck on the fattening period. Proceedings of 10th European Symposium on waterfowl, Halle, 110-117.

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