

Short Communications

Preference of rabbits for drinking from open dishes versus nipple drinkers

A. Tschudin, M. Clauss, D. Codron, J-M. Hatt

ADEQUATE provision of water is essential for animal welfare. Insufficient water intake can have various adverse effects in rabbits (*Oryctolagus cuniculus*), including reduced food intake, increased risk of urinary tract infections and urinary concretions (Kamphues and others 2009), dehydration with subsequent haemoconcentration, hyperthermia, exhaustion and finally death (Pond and others 2005). In rabbits with urinary tract disease, high water intake is particularly important and should be encouraged (Ewringmann 2005).

In rabbit husbandry, water is supplied by various drinking systems (Tetens 2007), but pet rabbit owners mostly use open dishes or nipple drinkers (Tschudin and others 2011). This study evaluates these two methods of providing drinking water, and the influence of restricted access to water (for 12 or six hours per day), on the preference and water intake of pet rabbits, as well as the time spent drinking and the number of visits to the drinker and of drinking bouts.

Twelve dwarf pet rabbits (bodyweight ≤ 2.3 kg) of various age, sex and breed were kept individually in open boxes with woodshavings as bedding material. Food and water were offered on an elevated area and the intake of each was recorded daily. Hay and grain (Hobby Cornmix; Landi) were provided as feed, and six of the rabbits were also fed fresh parsley. The grain and parsley were fed in a restricted manner while hay was provided ad libitum. The experiment was approved by the cantonal Animal Care and Use Committee (license number 114/2008); all animals were returned to their owner after the experiment.

Initially, the rabbits underwent a preference trial, in which they were given the choice between an open dish (Rössler Porzellan) 23 cm x 8.5 cm x 4.5 cm high, filled with 450 to 600 ml water, and a nipple drinker (Large Bunny; Classic Pet Products), height 18 cm x diameter 6.5 cm, with a maximum content of 620 ml and a metal nipple 7 mm in diameter. In a second experiment, the rabbits could choose between a higher (12 to 16 cm above ground level) and a lower (7 to 10 cm above ground level) nipple drinker. In addition, five of the rabbits were filmed (webcam SPC1300 NC, 1.3MP; Philips) for 252 hours on six three-day periods, during which the rabbits had access to water from either drinker for different periods

(24, 12 and six hours per day) to investigate their drinking behaviour and speed. Repeated measures analysis of variance was used for statistical analysis (PASW 18.0; SPSS).

In the first experiment, all 12 rabbits clearly preferred the open dish ($P < 0.001$) (Fig 1). The rabbits that were given parsley as part of their diet (rabbits 1 to 6 [Fig 1]) drank less than the rabbits fed only dry feed (rabbits 7 to 12). No overall preference for either of the two heights of the nipple drinkers was observed ($P = 0.897$), even if each animal consistently chose one of the two heights.

Records of water intake during video analysis of the five rabbits did not show a difference in drinking water intake between open dishes and nipple drinkers (mean [sd] 109.3 [49.2] ml/day v 103.5 [51.3] ml/day for 24 hours; $P = 0.053$), but drinking speed was three to four times slower with nipple drinkers than with open dishes ($P = 0.004$) (Table 1). The number of visits to the drinker did not differ between the open bowls and nipple drinkers ($P = 0.863$), but drinker visits ($P = 0.033$) and drinking bouts ($P = 0.020$) lasted longer with the nipple drinkers.

Restricted access to water disrupted the rabbits' normal circadian drinking pattern, which had two maximum periods of activity at around midday and around midnight when 24-hour access to water was available. When the rabbits' access to water was restricted to a set period, a high level of drinking activity was observed especially in the first hour after water was provided. Restricted access to water led to lower total intakes of water ($P = 0.021$) and dry matter ($P = 0.012$); the decreased water intake from the drinker ($P = 0.023$) resulted from fewer drinker visits ($P = 0.027$) and drinking bouts ($P = 0.011$), and a shorter total drinking time ($P = 0.001$).

This study found that the dwarf pet rabbits clearly favoured drinking from open dishes, although they had been used to drinking from nipple drinkers before. Although the numerical difference in drinking water intake between the drinking systems at 24 hour access was not statistically significant at $P = 0.053$, its direction corresponds with observations made by El-Mahdy and Karousa (1995) who found a lower water intake in rabbit groups on nipple drinkers when compared with other groups on open dishes. When drinking from open dishes, the rabbits showed a higher drinking speed (that is, volume water consumed per unit time) and spent less time drinking. Time constraints at nipple drinkers may thus explain the observation by El-Mahdy and Karousa (1995) that rabbit groups on nipple drinkers had a higher occurrence of fight behaviour than rabbit groups on open dishes. Drescher and Hanisch (1995) observed that young rabbits spent more time at nipple drinkers than at open dishes in a choice trial; however, water consumption from the drinkers was not recorded in their

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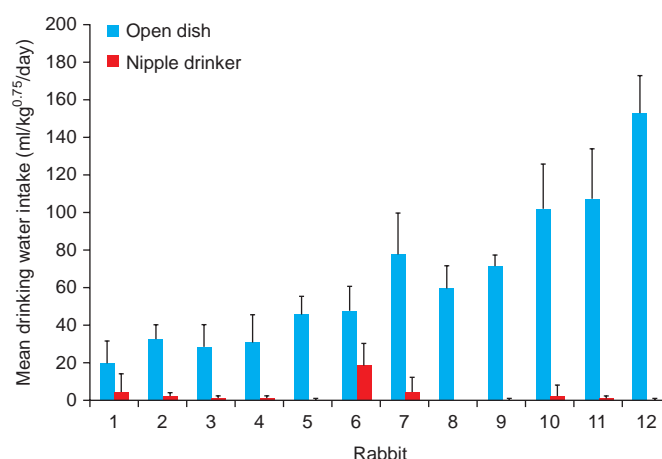


FIG 1: Mean (sd) daily water intake per kg metabolic body mass in 12 dwarf rabbits over a period of nine days in a choice trial (open dish v nipple drinker)

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TABLE 1: Effect of drinking system and length of time when water was available on water intake and drinking behaviour in five dwarf rabbits

Parameter	24-hour water access per day		12-hour water access per day		6-hour water access per day	
	Open dish	Nipple drinker	Open dish	Nipple drinker	Open dish	Nipple drinker
Effect of drinking system*						
Total drinking time per day (s)	484.3 (194.6)	1448.4 (389.6)	410.0 (176.0)	1386.9 (484.5)	285.8 (89.4)	1170.5 (452.9)
Drinking speed (ml/minute)	13.7 (4.5)	4.3 (1.8)	14.1 (2.9)	3.6 (1.3)	17.0 (4.9)	3.9 (1.7)
Mean duration of drinker visit (s)	55.5 (30.3)	141.3 (122.8)	55.5 (33.2)	164.6 (85.5)	82.6 (107.8)	163.1 (75.8)
Mean duration of drinking bout (s)	13.5 (5.4)	81.6 (48.7)	15.3 (5.3)	86.2 (44.0)	15.8 (4.0)	74.1 (35.4)
Effect of water access time†						
Total water intake (ml/day)	160.7 (84.1)		143.7 (61.4)		135.0 (65.1)	
Water intake from drinker (ml/day)	106.3 (49.3)		89.9 (42.8)		81.8 (38.3)	
Water intake from feed (ml/day)	54.4 (60.1)		53.7 (59.3)		53.2 (58.7)	
Dry matter intake (g/day)	60.1 (12.5)		56.1 (10.2)		52.9 (7.7)	
Total drinking time per day (s)	985.7 (578.7)		898.4 (612.5)		728.1 (552.6)	
Number of drinker visits per day	15.5 (7.8)		10.8 (4.8)		8.7 (3.7)	
Number of drinking bouts per day	30.0 (15.6)		24.5 (14.8)		17.5 (6.9)	

* Mean (sd) values of data collected over three days

† Mean (sd) values of data collected over six days

study. It is important to bear in mind that, according to the present results, spending more time drinking does not automatically mean that the animals consumed more water. In agreement with other studies (Lebas and Delaveau 1975, Prud'hon and others 1975, Ben Rayana and others 2008), restricting the rabbits' access to water led to diminished intake of both water and feed. Water restriction not only had a negative impact on the amount of water drunk but also changed the rabbits' circadian drinking pattern, and should be avoided. To correspond best to the preferences of rabbits, especially under conditions of increased need for water, such as urinary tract disease, the authors recommend offering water in open dishes *ad libitum*.

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