

## DRINKING WATER SUPPLY IN RABBIT PRODUCTION: SHORT REVIEW

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***Abstract:** In the European regulation and expectations of consumers one of the most important points is the welfare of farm animals. Not many researchers in the international and Hungarian scientific literature have been concerned with the supply of drinking water to domestic rabbits. The authors aim was to prepare a short overview on the water quality, water supply and drinkers by the existing sources. Due to the limited extent of the paper the authors' study did not cover the administration of water-soluble substances (vitamins, medicines, feed supplements, etc.).*

***Key words:** rabbit production, drinking water, animal welfare, water quality, drinkers*

### INTRODUCTION

In the past, farmers have often voiced the completely misconception that rabbits should not be given drinking water when feeding both green forage and root or tuber vegetables [13]. If greenstuff is the only source of water the rabbits must suffer seriously from thirst.

The feeling of thirst is basic to the animals' existence, but it is essentially an urgent situation mechanism: the function of which is to improve an actual deficit of liquid. When feed and water are freely available and climatic conditions are favourable, thirst is perhaps never experienced [8]. If the normal order of water consumption does not satisfy the daily needs or if the rabbit is exposed to the stress of a dehydrating stimulus, it will experiences polydipsia and is driven to seek water.

The rabbits lose a significant amount of water daily through exhaled air, evaporation through the skin, urine, faeces and possibly the milk produced. Basically, drinking water is used to cover the water demand.

Water is probably the most often disregarded basic material (or maybe more properly: nutrient) of diets. Not many researchers in the international and Hungarian scientific literature have been concerned with the supply of drinking water to domestic rabbits. The authors aim was to prepare a short overview on the water quality, water supply and drinkers by the existing sources.

### MATERIALS AND METHODS

A literature review of drinking water supply in rabbit production was presented in this paper. Different scientific research results in the topic, and collected data for requirements for rabbit were studied by the authors. The paper was induced by a discussion on the standard of minimum water requirement of the rabbit farming in the European welfare guide, which is under preparation. The selection of publications was made by the subjective choice of the authors due to limited scope, but it was based on the scientific results of relevant authors.

### RESEARCH RESULTS

#### **Consumption of drinking water**

Fresh and good quality, clean drinking water must be available at all times. The water requirements of rabbits vary with age, type of fodder, environmental temperature and status of production (Table 1). The drinking water demand in general is 2-2.5 times [18] (up to more than three times [16]) that of dry matter intake at an average environmental

temperature of 20°C. The water requirement is 50% higher at 30°C, but also increases when the temperature is below the optimum (because rabbits eat more in cold environment).

**Table 1.**

**Daily drinking water consumption of medium sized rabbits**

	ml	Source
Young animal	200-300	[17]
Adult animal	300-500	[17]
	1100-1300	[12]
Doe with litter (0-14 days)	800-1500	[17]
Doe with litter (14-28 days)	1500-2500	[17]
Doe with litter (28-42 days)	2500-3500	[17]
	3800	[2] [5] [22]
Adult New Zealand White rabbit normal value (range)	200 (160-250)*	[2]
Adult animal	420-570	[16]

\*ml/kg body weight

When determining the technological water demand, the leakage of the drinkers and the technological water (cleaning, evaporative cooling) must also be taken into account.

**Quality of drinking water**

In most sources on rabbit nutrition, the part dedicated to quality of drinking water is very poor. A general remark is that “the water given for rabbits should be drinkable” and the given quality characteristics are usually those for human consumption, without any comment. The quality parameters and standards for potable drinking water are differ in different parts of the world, but general recommendation is exist by WHO [1], and guidelines including the complete preventive risk management concepts for ensuring drinking water quality is also introduced. Avoid collecting sample from unused wells or directly after drilling and throughly pump wells before sampling [20].

Due to the human activity in general, and particularly the unfavourable effects on the environment by the intensive agriculture in several countries pollution of water (e.g. nitrate content, pesticides) is now well documented [9].

As a general opinion, the animals drink a lot of water, but they will not consume dirty water, so potable water should be available for rabbits ad libitum. Water quality can be checked by laboratory testing [7]. Of course, this applies to water from your own wells, tap water does not need to be tested.

The optimum temperature for drinking water is around +15°C. If its temperature is below +8°C, it can cause disease [12]. The harmful effect of hot environmental temperatures (over 29°C) on daily feed intake probably partly compensated by providing of cooled (16–20°C) drinking water. The disadvantageous effects of summer heat stress on conception rate, litter size and litter weight at both kindling and weaning could be compensated with cooled drinking water [24] which has favourable effects on the homeostasis of the does, and bringing the rabbits closer to normal conditions. Daily milk yield, feed intake and daily water intake is reduced by heat stress, but the water/feed ratio in the groups of does increased [15]. Under hot climate conditions, it is recommended to cool the water to the rabbits. On the other hand water temperatures on average, did not affect significantly total weight gain, feed intake, feed conversion ratio and rectal temperature of meat rabbits [19]. Schley’s results show the water temperature has little importance, but temperatures higher than 8°C are recommended [17].

### **Restricted water consumption**

Water restriction, which is an indirect feed restriction, is a common practice to reduce post weaning digestive disorders in rabbits [3].

The number of drinks was reduced, being 38 and 47 per day for restricted and ad libitum rabbits, respectively [11], although the amount of water consumed was higher for restricted rabbits. The ratio of water to feed is doubled for rabbits restricted to 65% of ad libitum, from 1.68 to 3.46. This author also reported that a similar 35% reducing in feed intake could be obtained with a 1 hour access to the drinker, and then the ratio water to feed decreased to 1.20. Previously water restricted young animals following free gain access to drinking water compensated significantly for growing and development [6].

The applied water restriction by Bovera et al. [4] between 35 and 60 days implemented during the winter season improved the digestive health of animals, with no disadvantageous effects on carcass traits, and physical or chemical meat properties.

However, from the animal welfare aspect, the water limitation could be criticized as a method to reduce time and/or amount of feed intake. This kind of water restriction procedure, used for experimental purposes, is not encouraged to practise in farm conditions, as it is debatable as regards animal welfare and does not fit with the legal regulations in many European countries. As a consequence, putting in application a short-term restriction program will not absolutely follow one of the five freedom rules: freedom from hunger and thirst.

In our opinion, it is unnecessary to measure the amount of drinking water; water should be available to the animals permanently (ad libitum).

### **Drinking devices**

Rabbit breeders use several types of drinker systems. Small holders and pet rabbit keepers prefer water bowls (Photo 1) (e.g. glazed earthenware crocks, cans [22]) and drinking bottles (Photo 2). In case of drinking bowls [10] the water consumption increased with more than 1.5 times, the milk production of the does is higher with 9%, the weightgain of the 3-9 weeks old rabbits was 8.7-27.8% better and the mortality decreased with 6.5% than the use of automatic system. To keep clean drinking bottles is easier than water bowls, but both of them need much labour and daily maintenance.

The designs of cages should include the appropriate location of the drinker. The front panel of the cage will have space occupying by the feeder, the waterer and by the door of the cage [14]. This may be done by the application of simple crocks, watering bowls or bottle drinkers which hang on the cages. As a result, the animals in the cage can receive the quality of observation and taking care (e.g. checking waterers) that they require.

For rabbit farms it is advised installing an automatic watering system (Photo 3). There are a lot of different types of automatic waterer systems. This kind of system provides constantly sufficient drinking water supply for the animals. Rabbits learn to use the valves easily [5].

The drinker system should consist of a pressure reduction tank (or reservoir) with a floating valve. The pressure reduction tank also allows the heating or cooling the water and the addition of various substances to drinking water. The pressure in the drinker pipeline is about 0.14kp/cm<sup>2</sup>. If the pressure is higher the rabbit will not be able to push the valve (nipple drinker) with its tongue, if too low the valves will drip. The correct height of the valves is 17-23 cm from the cage floor depending on the size of the breed.



**Photo 1. Open bowl drinker**

Source: Karoly Bodnar



**Photo 2. Bottle drinker**

Source: Karoly Bodnar



**Photo 3. Nipple drinker, pipeline at the front of the cage**

Source: Karoly Bodnar

If the nipple drinker points straight downward rabbits can have some difficulties drinking from the valve [25], but obliquely installed usually only valves made for this purpose or spring-loaded valves are possible.

The pipeline in many automatic systems is at the back of the cages. Repair of such a pipe often cause a difficult problem [14]. The cages have to be depleted and disassemble to get access to the pipe. For these reasons, many rabbit farms are recently being constructed with the pipelines and nipple drinkers on the front panels of the cages.

Tsudin et al. [23] investigated the influence factors for water intake subjected to different watering regimes with practical relevance. Drinking water was provided either by

open drinking bowls or automatic waterer system with nipple drinkers. Water was accessible ad libitum except for four treatments with 6 hours or 12 hours water access. In case of restricted water supply, rabbits demonstrated a significantly higher water intake with open surface drinkers compared with nipple valve drinkers. Restricted access to drinking water led to a reduced total daily water intake and an increased dry matter content of faeces and urine. The authors recommend an open bowl as rabbit drinker.

All kind of drinking devices need careful and frequent (at least daily) checking and maintenance; without it is impossible to know whether or not each rabbit is obtaining adequate water, or limescale from hard water often causes dripping.

Watering systems have to be designed and constructed, placed, operated and maintained to meet the physiological needs of the animals [21]; make impossible leakage or contamination of the water, each animal should have adequate access opportunities, so avoid competition among rabbits for water; do not cause injury of the animals; the water consumption can be controlled.

### CONCLUSIONS

The drinking water of the right quantity and quality is an essential nutrient, important element of the welfare and changes in water consumption can directly indicate the health status of the herd and its response to changes in environmental factors. Further studies are needed to determine which type of drinker system is most suitable for rabbits kept on the floor and how the leachate from the drinkers to the litter or floor affects the health of the animals, e.g. ulcerative pododermatitis ("sore hocks") and respiratory diseases (due to the increasing ammonia levels).

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