NOTES

Modifying the Hoeltge HB-1110 FW flush rack for automatic water deprivation

CHARLES P. RANSFORD
Hillsdale College, Hillsdale, Michigan 49242

The modification described in this article makes automatic water deprivation possible with the Hoeltge HB-1110 FW flush rack. Since the rack already features automatic watering and excreta removal, the result is a system that does not require daily attention (Figure 1). This system has been in operation in our laboratory for 1 year and has proven to be very reliable and maintenance free. The modification is relatively simple and involves the use of two additional solenoid valves and a 24-h timer.

Figure 1. A Hoeltge HB-1110 FW flush rack modified for automatic water deprivation; one solenoid valve is installed next to the water reservoir and another is inserted in the drain line. Aquarium hose bleeds the air out of the lines as they fill with water, and a glass tube on the top of the rack serves as a water-level gauge.

The Hoeltge flush rack has two stopcocks for draining the automatic drinking system. To modify the unit, remove the stopcock on the bottom and replace it with an Automatic Switch Company (ASCO) normally closed solenoid valve (8210C93). An ASCO normally open solenoid valve (8210B33) is inserted in the plastic pipe that exits from the water reservoir and leads to the nozzles in each cage. When 110-V ac is supplied to both of these valves, the normally open inlet valve closes and the normally closed outlet valve opens, draining the automatic watering system onto the bottom shelf of the flush rack. When the power to these two valves is off, the outlet closes and the inlet opens. Within 2 min water from the reservoir completely fills the system. The reservoir capacity of this flush rack is large enough to both fill the drinking-water pipes and fulfill the daily drinking requirements of a full rack of 60 rats.

An Intermatic T175 single-pole double-throw timer controls the power for the two solenoid valves and a bell, which signals the availability of water. When the timer is in the "on" position, power is supplied to the bell but not to the solenoid valves. It is not necessary to use the bell since there are several other subtle visual, auditory, and temporal cues which the rats make good use of. When the timer is in the "off" position, the bell is off and the watering system is empty. Consequently, if the timer is programmed for 23-h water deprivation, power is supplied to the two solenoid valves almost continuously. The inlet and outlet valves can be switched so that they operate only 1 h a day; however, with the former arrangement water is available to the rats in case of a power or solenoid failure.

Air pockets may develop in the pipes as they fill with water, preventing individual nozzles from dispensing water. Therefore, the stopcock on the top of the rack is always open so that air can escape as the lines fill with water. A 6-in. piece of glass tubing inserted into the open stopcock prevents water from overflowing at the top and indicates water level. But even with the stopcock open, air pocketing may develop in the water line leading to the top row of cages. Air pocketing can be eliminated by drilling a hole into the top of this water line. A piece of aquarium hose is inserted into the pipe, and the other end is placed above the reservoir. When this modification is made, sites of air pocketing can be located and then alleviated by using the above procedure.

This modification can probably be adapted to other Hoeltge flush racks designed for mice, rabbits, hamsters, guinea pigs, dogs, cats, primates, and small farm animals.

(Received for publication March 12, 1977;
revision accepted April 13, 1977.)