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**AN AUTOMATIC FEEDING SYSTEM FOR CULTURING
ROTIFERS WITH DRY FEED**

by

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ABSTRACT

An automatic feed distribution system for culturing rotifers is described and discussed. The system has been successfully used at the Austevoll Marine Aquaculture Station for 3 years.

INTRODUCTION

Most problems concerning intensive production of marine fish fry is related to the start feeding of the young stages. Marine fish larvae are small and need food particles of right size and with high nutritional quality (Kinne , 1977; Huse et al., 1983; Watanabe et al. 1983). In intensive start feeding of marine fish larvae, collected natural zooplankton and cultured live food organisms like Brachionus plicatilis, Artemia salina and other crustaceans are most commonly used (Kinne, 1977; Kahan et al., 1982; Gatesoupe and Luquet, 1981; Huse et al., 1984).

At Austevoll Marine Aquaculture Station the rotifer Brachionus plicatilis were cultured since january 1982. The rotifers were produced in continous cultures at 32 o/oo seawater and at a temperature of 24 C. Total production volume was 4000 liters. The rotifer were mainly fed dry feed according to a method described by Gatesoupe and Luquet (1981). Cultured microalgae (Nannochloris atomus) were used as a feed supplement two or three times a week. Before the rotifers were fed to marine fish larvae, they were enriched with a special dry feed (Huse et al. 1984).

Due to the fact that the total feed amount had to be distributed during normal working hours pollution problems resulting in suboptimal production was experienced. Production tests indicated, however, that these problems could be avoided by dividing the same total amount of dry feed into small batches which were distributed to the cultures between 6 a.m. and 12 p.m. In this way pollution was reduced as the rotifers were able to consume most of the feed before it had dissolved. As a consequence an automatic feed distribution system for culturing rotifers with dry feed was developed.

System description

Figure 1 shows the automatic feed distribution system. Weighed dry feed is placed in the feed cups (1), and feeding time and frequency is set in the control unit (2). At the selected feeding

time the feed cup belt moves one position forward so that the dry feed falls into the mixing bowl (4). Simultaneously magnetic valve 5 opens so that seawater is filled in the mixing bowl (4). When the bowl is filled the mixer (6) starts to mix dry feed and seawater. After a preset time the mixing stops and magnetic valve 7 opens, the pumps starts and the feed mixture is pumped out to the rearing tanks through preset valves. Both the time for feeding, the frequency, time for seawater in and out, and mixing time can be selected independently of each other.

RESULTS AND DISCUSSION

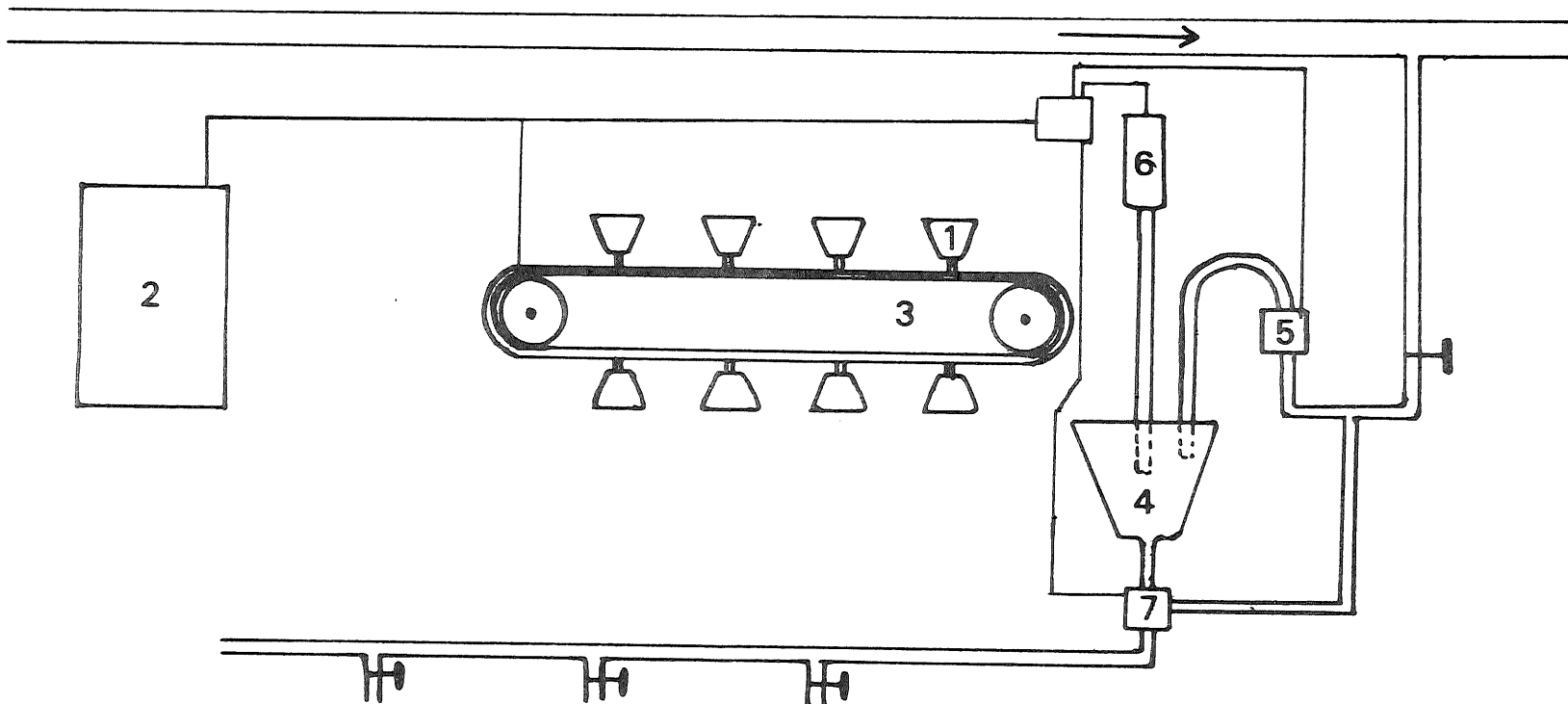
The rotifer density in the rearing tanks (volumes of 250 liters and 1700 liters) were around 35 - 40 Brachionus per ml (Bpm) with manual feeding three times a day. This was achieved for periods of 6 to 8 weeks with maximum densities of 70 - 80 Bpm. The rearing tanks were, however, extremely sensitive to overfeeding, which often resulted in drastic reductions in rotifer density.

Using the automatic feed distribution system the average daily rotifer density in the rearing tanks increased to between 70 - 80 Bpm. This density was maintained relatively stable for several months. Technically the automatic feeding system functioned well with cleaning once or twice a week.

The cost of the system will be in the order of magnitude of £ 2000. The described system operates with ordinary timer switches. A further enhancement would be using a programmable logic controller (PLC) instead. This would add an extra £ 800 or so to the cost, but would simplify adjustment of parameter settings.

LITTERATURE

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distribution valves

Fig. 1 Automatic feed distribution system:

1) Feed cups	5) Magnetic valve for incoming seawater
2) Control unit	6) Mixing device
3) Transport belt	7) Magnetic valve for outlet feed mixture
4) Mixing bowl	