

Utilization of species specific vocalizations to improve productivity and welfare in food producing animals

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1. INTRODUCTION

The need to efficiently produce abundant, safe and healthy food of animal origin often conflicts with ever increasing societal concerns about animal welfare. Traditional management methods may increase productivity but create a detrimental effect on animal welfare. The use of species specific vocalizations, be they maternal, from the progeny or in combination, appears as a clear opportunity to enhance productive processes without compromising animal welfare.

1.1 Objectives

Three species; poultry, turkeys and swine, have been used to evaluate the effectiveness of using maternal, progeny or a combination of vocalizations to enhance different aspects of production. In the avian species the objective was to initiate ingestive behaviour as early as possible and to maintain higher levels of food consumption by reproducing maternal calls. In pigs the objective was to increase frequency of feeding by using a combination of sow and piglet nursing sounds.

2. METHOD

2.1 Turkeys

Recordings of contempt turkey hens vocalizations were reproduced in the incubator for five minutes every hour during the last 5 days of incubation. Recordings of broody turkey hens vocalizations were reproduced through speakers placed in the feeder of newly hatched poults for two minutes at 20 minutes interval. These were compared to groups of animals raised in similar housing without the sound stimulation. Performance in growth and mortality were recorded every three days for the first three weeks of age.

2.2 Poultry

Recording of broody hen were played back for two minutes every 20 minutes from within the feeder or from a speaker in a lateral wall of the pens. Growth performance was monitored for the first two weeks of age.

2.3 Swine

Sounds were recorded in a farrowing room (including sow feeding calls, piglets feeding grunts and room background noise). These recordings were played

back to newly farrowed sows for 3 minutes at either 37, 47 or 57 minutes during the first three weeks of life.

3. RESULTS

3.1 Turkeys

The vocalizations of turkey hens are characterized by repeated cycles (4 sec long) of a sequence of clocking sounds at 0.3-0.4 sec intervals. (Fig.1) The majority of the spectrum is based in frequencies of 1-5.4KHz and almost nothing below 400Hz.



Fig. 1. Pattern of one cycle of vocalizations of a broody turkey hen.

There was no beneficial effect on exposing eggs to contempt vocalizations at the end of the incubation period.

Exposing poults to broody feeding calls elicited feeding response within the first 2 hours after placing in the pens. The increased feeding activity observed in sound exposed animals translated in an increase in body weight of 16, 19 and 12% on days 3, 15 and 21 respectively. This weight increase did not translate in significant changes in body composition.

3.2 Poultry

The vocalizations of a broody hens were repeated cycles of (about 2.5 sec long) a sequence of 8 to 10 short clocking repeated at increasing frequency during each cycle (Fig2.)

Exposing newly hatched chicks to broody hen vocalizations resulted in approach to the source of sound within the first two minutes of stimulus. Birds in pens with the speaker in the feeder initiated ingestive activity within the first cycle of stimulus while birds in pens with the speaker in a wall spend the first 18 hours approaching the speaker in the wall upon

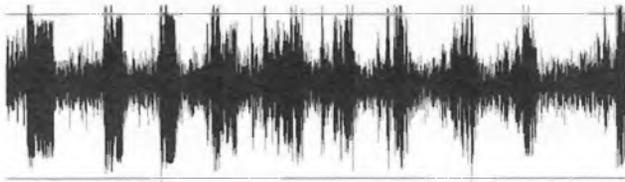


Fig. 2. Pattern of one cycle of vocalizations of a broody hen.

stimulation and did not initiated any significant ingestive activity. As a result of the treatment birds stimulated from the feeder were heavier than those stimulated from the wall and these, in turn, heavier than the controls. (Fig 3.)

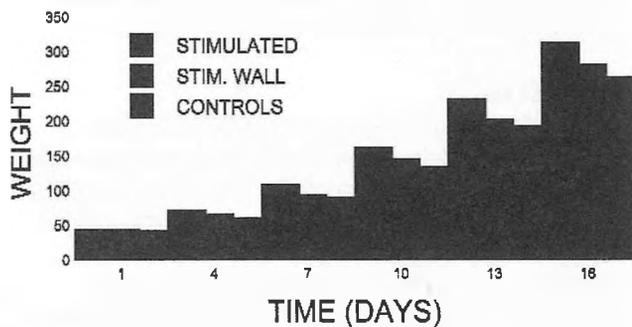


Fig. 3. Weight change in chicks exposed to vocalization stimulus over the first two weeks of life

3.3 Swine

The vocalization of sows consist of a sequence of very low frequency tones grunts lasting about 0.1 sec every 0.6-0.8 sec. The sequence of nursing vocalizations last between 2-3.5 min., of which one minute is shown in Fig. 4.



Fig. 4. Sequence of sow vocalizations recorded over one minute.

There was an overall significant treatment effect on the weight of the piglets when the feeding calls were used every 47 and 57 minutes (Fig .5) however, when the frequency of feeding calls was increased to 37 minutes, the response was similar to that observed in the animals of the control group.

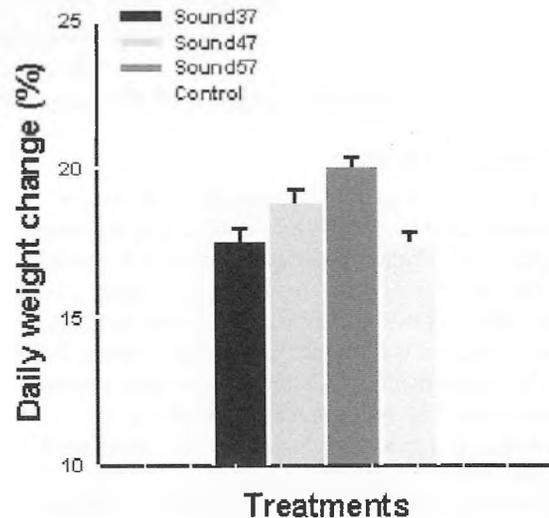


Fig. 5. Performance of piglets stimulated with sound nursing calls at different frequencies.

At a frequency of 47 minutes the piglets in the sound stimulated group performed significantly better than those in the control group. The sound exposed animals grew an average of 2.29% faster than the controls. This value is not only statistically significant but it can be economically significant. At a frequency of 57 minutes there were no differences between the sound treated animals and the concurrent controls

The results to date appear to indicate that the use of feeding calls can enhance growth rate in lactating pigs as long as the frequency of vocalizations is adequate. The behavioural data should confirm if this is due to an actual increase in the frequency of suckling. In preliminary trials it was observed that the response of the piglets to maternal calls was more noticeable when the sound was reproduced by speakers capable of delivering very low frequency. A trial is presently being conducted to determine the frequencies within the vocalization which convey the signal to the newborn animals

4. CONCLUSIONS

It is clear that several food producing species can be manipulated to enhance productivity via auditory signals. These appear to be much more welfare friendly than other traditional methods to increase productivity.