Initial insemination interval: one approach to improving turkey fertility

Francine A. Bradley □ Frank X. Ogasawara

In the past 30 years, there have been decided increases in the reproductive efficiency of turkeys. Refinements in artificial insemination techniques have eliminated problems associated with natural mating, such as injury to the hen, clumsiness of the male, and preferential mating. Specially formulated diluents have made it possible to extend the semen from superior toms and reduce costs associated with maintaining large numbers of males. However, the turkey breeder hen still does not produce fertile eggs at the same level or with the same persistency as the chicken breeder hen.

A common industry practice is to inseminate virgin hens on days 1, 5, and 10 at the beginning of the reproductive season and then to inseminate every 2 weeks, as long as the fertility remains relatively high. We have conducted research on effects of the initial insemination interval on the level of fertility. The series of inseminations was performed only once, to test the effect of the interval on duration of fertility.

The experimental birds were virgin Broad Breasted White hens that had been in production for approximately a month. The birds were divided into three groups and caged individually. Semen was collected from males of the same strain and diluted one part semen to two parts modified Lake's diluent. Each insemination dose contained a minimum of 100 million spermatozoa, and each hen received a total of three inseminations. Therefore, each hen was inseminated with at least 300 million spermatozoa. The experimental variable was the interval of which the three inseminations were performed. Group 1 received all three on day 1. Hens in the other two groups each received a single insemination on the first day. Group 2 hens were inseminated again on days 2 and 3; those in group 3 received their second and third inseminations on days 5 and 10, respectively.

After pedigreeing and incubating all the eggs, we were able to compare the levels of true fertility for the three groups. In terms of weekly fertility values, week 1 being defined as starting on the second day following the first insemination, fertility was high even during week 1 for groups 1 and 2. In the first week, mean fertility values were 87.2 and 85.6 percent, and peak values during the second week were 97.5 and 95.2 percent for groups 1 and 2, respectively.

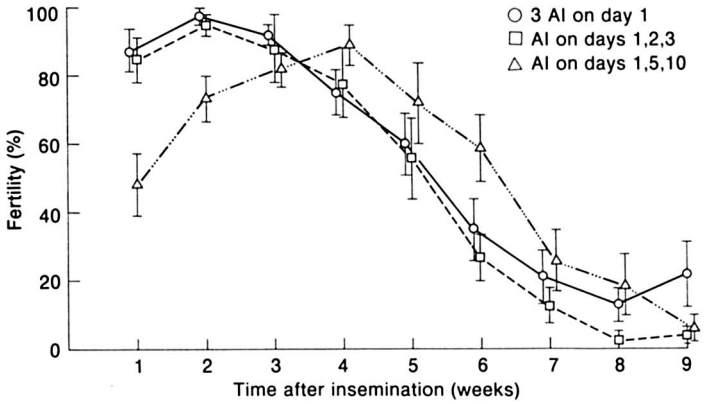
Using a one-way analysis of variance and a multiple comparison test, we found that the only statistical differences in the 10-week test period occurred in the first 2 weeks, when comparing the values for group 3 with the other two groups. The fertility of hens inseminated on days 1, 5, and 10 was 47.7 and 73.6 percent for weeks 1 and 2, respectively. These values were significantly different and lower than fertility values obtained for the other two groups. Group 3 had a peak fertility value of 88.9 percent, which also was lower than the peak values obtained in the other two groups.

It could be argued that we were biasing the data against group 3, since these hens did not receive their final insemination until midway through the second week. When we recalculated the data for the 7 days following the final insemination in each group, there were no statistically significant differences between groups.

We had expected the fertility curve of birds inseminated on days 1, 5, and 10 to be displaced to the right of the other two curves. However, although the number of inseminations was the same and all groups received an equal number of spermatozoa, the group 3 fertility curve was a completely different shape. We had anticipated an extended duration of fertility for group 3, since the hens in that group received their last insemination 7 and 9 days after the last insemination for groups 1 and 2, respectively. However, there were no significant differences in duration. The group 3 insemination schedule may not have resulted in filled sperm storage tubules, which may explain why fertility in this group was not extended.

The decreased fertility in the first 2 weeks, lower peak fertility value, and lack of extension of fertility under the commercial insemination regime of 1, 5, and 10 days suggest a beneficial effect in having the three inseminations occur in close succession. Possibly, there was a stimulatory action on the reproductive tract with regard to sperm storage mechanisms. Certainly, the more concentrated insemination schedule would mimic mating activity in natural situations. It must be reiterated that the hens used in this experiment were in cages, which increased the feasibility of successive handling. Further investigations may reveal that fertility can be enhanced merely by altering the intervals at which inseminations are performed.

Francine A. Bradley is Research Associate, Cooperative Extension — Poultry; and Frank X. Ogasawara is Professor, Department of Avian Sciences, University of California, Davis.



Longer intervals between artificial inseminations of turkeys resulted in a different fertility curve and a lower peak, but no extension in fertility.