

Male Replacement Programs to Improve Persistency of Fertility

Jonathan Lester, Head of GGP Operations, Aviagen Ltd., Johnny Courtney, GP Operations Controller, Aviagen Ltd., Lazlo Koros, Operations Manager, KFT., Dr Vanessa Kretzschmar, Global Technical Transfer Manager, Aviagen Inc., Neil Clark, Global Technical Transfer Manager, Aviagen Ltd., Jason Mack, VP of Operations, Aviagen North America., Daren Rakestraw, Technical Manager, Aviagen North America., Leon Vogels, Production Director, Aviagen GmbH.

INTRODUCTION

If managed effectively, male replacement programs can help to improve persistency in fertility. Introducing a number of new, generally younger males into a flock causes a change in the flock's social pattern, stimulating the mating activity within the flock and increasing overall flock fertility and chick output. Although male replacement programs are not a substitute for good male management, the aim of this document is to provide advice on how these programs can be managed successfully, maximizing flock fertility and chick output and ensuring bird welfare.

BIRD HANDLING

It is important that all birds are handled in a calm and correct way at all times. All people handling birds (for catching, weighing, physical assessment, crop fill assessment, or vaccination) should be experienced and appropriately trained so that they can handle the birds with the care that is appropriate for the purpose, age, and sex of the bird.

BIOSECURITY

Prior to any discussion on male replacement programs it is important to understand and manage the biosecurity risks associated with movement of males. Replacing males carries an increased biosecurity risk when the health and vaccination status of the new males and recipient flock are not the same.

The biosecurity and health status of the local environment and operation must be taken into account.

- Source flocks must test negative for certain pathogens prior to the move. The list of pathogens to sample must be based on local conditions, but as a minimum must include Mycoplasma and Salmonella spp. The time of testing will also depend on local requirements but is likely to be 5 - 10 days before the move.
- The source flock should be checked for the presence of parasites before a decision to move is made.
- The vaccination program of the replacement males should be the same as the females they are to be mated with. This is especially important where live respiratory vaccines are used.
- For a period of 1 month after the move, the recipient flock should also be tested to ensure it remains free from pathogens.

Proper cleaning and disinfection of the transport equipment and vehicle is essential. The transport vehicle route should be managed to reduce the biosecurity risk as much as possible. This route should avoid other poultry facilities and areas where waste from poultry sites has been discarded.

PERFORMANCE TREND ANALYSIS

Before making the decision to add replacement males to a flock, an analysis of both historic and current flock trends should be carried out. This should include hatchability, fertility, and male and female body weights and will help to determine if male replacement is actually necessary.

SOURCING REPLACEMENT MALES

Only males that have been managed well during the rearing period and meet the correct criteria should be considered for use as replacements. Critical points for monitoring during the male rearing period are:

- Correct stocking density for the age of the birds. Local legislation must be adhered to at all times.
- Correct feeding space for the age of the birds.
- Correct body-weight gain, skeletal development and fleshing.

Males which are poor quality at the end of the rearing period should **not** be used in the replacement program.

Globally, there are various methods used when replacing males in a flock. Detailed below are the most effective and successful.

Option 1a: Addition of younger males to an older flock

This method is generally used when there are regular breeder flock placements, allowing good availability of younger males for replacement. Additional males are moved directly into a production flock and mated with females of the same age; they are then transferred after 5 to 6 weeks of conditioning into an older flock as replacement males.

In preparation, a selection of adult males is carried out in the late rearing period and only suitable males moved into the breeder house with the females. The quantity of males moved at this time will give a higher initial male to female ratio in the early lay period. The initial mating ratio should not exceed 10 males per 100 females. Care should be taken during this time to ensure that the additional males are sexually synchronized with the females. This can be observed by paying attention to the feathering of the females and to behavioral changes of the flocks. ***It is an option to add 5% males into the flock, and increase by 1% per week (keeping the spare males at the same farm) until the correct male to female ratio is achieved. When holding males in a separate pen, make sure stocking density and feeding space is not restricted. The number of males to be moved for male replacement is pre-determined so that sufficient males are left in the younger breeder flock.***

The flock is light stimulated and fed normally for weight gain to mature both the females and males. During the male transfer week (around 25 weeks), the largest and most mature males are selected and used for moving to older flocks (in houses with similar setup). Males can be marked early in the morning when they are at the feeder and male size can be easily established.

This option works well because the replacement males are familiar with the breeder house setup. They also have the benefit of having been mixed with females for 5 - 6 weeks prior to the move. Selecting the largest framed males in the flock is key to this method being successful. Criteria of males for flock standard are given under 'Replacement male criteria'.

Option 1b: Addition of younger males to an older flock (transfer of males into a separate pen / male house)

This method differs from that above in that the males are transferred from the rearing farm into a separate male pen or male house for conditioning prior to being introduced to the recipient flock.

At the final selection in rear, large males are removed from the flock and placed either into a separate male pen in the production house or into a separate male house on the farm where they will be used as replacements. This allows them to be conditioned and light stimulated to maturity, and helps immature light males to be sufficiently mature when moved in with the females.

Aviagen Brief - Male Replacement Programs to Improve Persistency of Fertility, March 2017

Where birds are transferred into a separate male pen, caution should be taken to avoid compromising stocking density and feeding space as this can negatively affect bird welfare and performance. Even for short periods of time, incorrect stocking densities and feeding space will affect male development and reduce future performance levels. Care should also be taken not to reduce female floor space, feeding space and nest space when providing a separate male pen in the production house (**Figure 1**).

Figure 1. Example of a separate male pen within the production house.



Transferring males into a separate male house provides advantages of a controlled environment, including stocking density, feeding space, and lighting programs. This will help to ensure that they have a similar environment to the one they will experience when moved in with the females.

Criteria of males for flock standard are given under 'Replacement male criteria'.

Number of males

The number of males to be moved into an older flock depends on the availability of replacement males. A change equal to 30% of the existing male numbers can be effective, but a mating ratio of 10 males per 100 females in either the donor or recipient flock should not be exceeded (**Table 1**).

Females should be monitored for signs of over-mating, such as feather damage to the back and thighs. Selection of males should be an ongoing task over the lifetime of the flock and unsuitable males should not be kept simply to maintain male numbers.

Table 1. Example of recommended mating ratios for Ross[®] 308 (mating ratios for different breeds should follow Aviagen[®] guidelines for that specific breed).

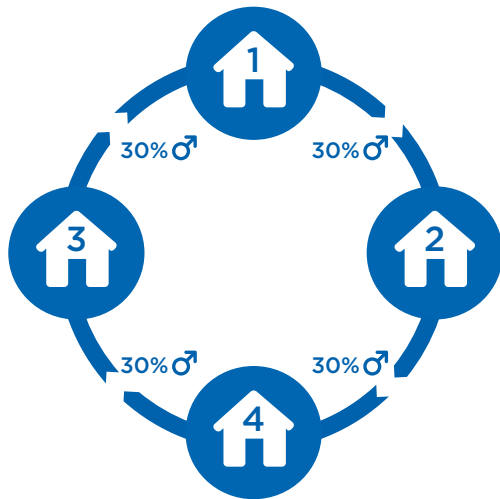
Age		Number of Good Quality Males Per 100 Females
Days	Weeks	
154 - 168	22 - 24	9.50 - 10.00
168 - 210	24 - 30	9.00 - 10.00
210 - 245	30 - 35	8.50 - 9.75
245 - 280	35 - 40	8.00 - 9.50
280 - 350	40 - 50	7.50 - 9.25
350 to depletion	50 to depletion	7.00 - 9.00

Option 2: Male rotation

*In this method, males of the same age are rotated between the production houses on a single farm unit (**Figure 2**). This substantially reduces the biosecurity risks associated with moving males between sites. Male rotation is common in operations where there is no access to younger males.*

Using this method, the first male movement will normally take place around 40 weeks and may need to be repeated every 8 to 10 weeks through the flock's life, depending on effectiveness.

Figure 2. Example of rotating males between production houses.



In planning for male rotation, the males must be assessed for body weight and condition. Those identified for move should be clearly marked with stock-paint on their backs. Males of low body weight and poor condition should not be selected. On the day of move they should be placed into a suitable pen at the end of the house and moved into the next house. Ideally the move should take place during the dark period, allowing males to be well distributed in the house and reducing the stress on the males and recipient flock females.

Regular assessment should continue in the post-move period to confirm the male's introduction into the population has been successful. This should include separate body weight and condition monitoring.

MANAGING THE REPLACEMENT PROCESS

Timing of move

Replacement males that are moved into a flock around 40 weeks may provide a balance between the benefit to the fertility of the flock and the biosecurity risk associated with the move.

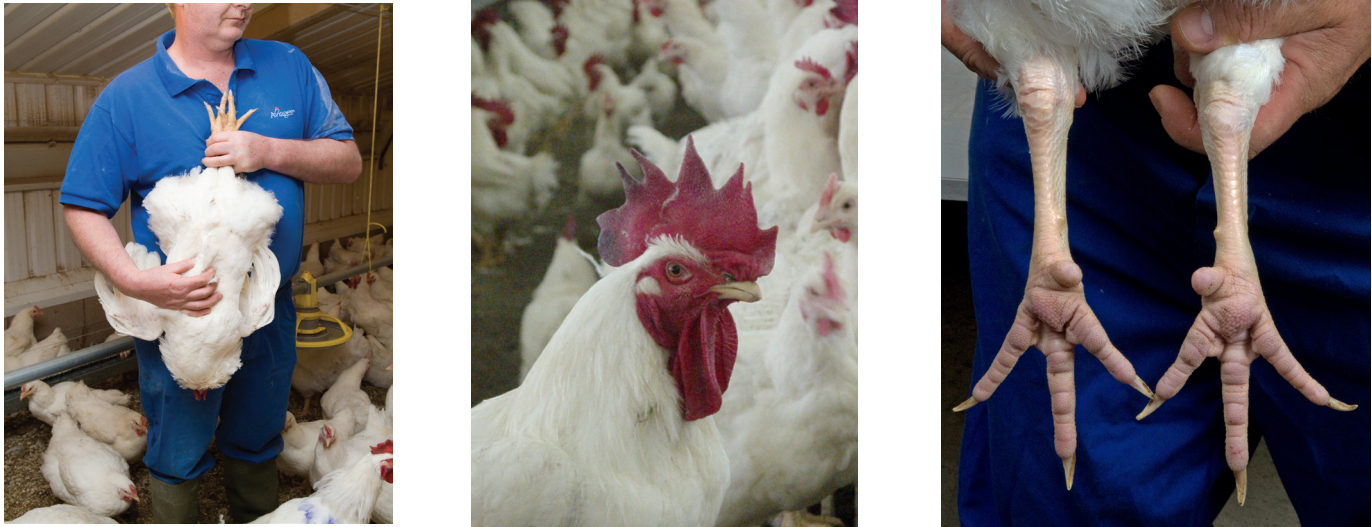
Transporting Males

Where males are transported, a number of factors should be considered. The type of crates or modules for moving the birds, along with the local environmental conditions, length of journey, and body weight of the males will determine the number of birds per crate or module. For bird comfort, it is advised to move the males during cooler temperatures (at night). Local legislation for transporting birds should be followed.

Replacement male criteria (when introducing younger males)

Replacement males should be of an appropriate body weight (3.9 - 4.1 kg / 8.5 - 9.0 lb). As a minimum, they should be the same average body weight and frame size as the males in the recipient flock and in good condition (fleshing) (**Figure 3**). They should be mature, with a fully developed comb and wattles. In addition, they should have good legs that are straight, with no bent toes, and footpads that are clean and free from abrasions. They should be light stimulated at least 3 (ideally 4 - 5) weeks before being introduced into an older flock.

Figure 3. Attributes of a good quality male which can be used for replacement.



Replacement male management

For any system of male replacement it is essential to ensure adequate feeder and drinker space. Feeder height can be a problem for newly introduced replacement males, and may require to be adjusted. Feeder height can be lowered by 10 - 15 cm (4 - 6 in) for up to a week. Observing the flock at feeding time is the best way to determine if replacement males are finding feed and also checking that the females are not able to steal feed from the males.

Once introduced into the flock, replacement males should be weighed separately for at least 4 - 6 weeks to ensure they are eating (check crop fill) and gaining weight. It is therefore important that these males are easily identified. This can be done by marking them with stock-paint on their backs.

Male selection

It is advised to observe and remove males from the flock daily as part of the normal male management routine. Males that are pale around the eyes with a pale comb and wattles, a dry / pale vent or poor legs should be removed. For more information on selecting good quality males, please see the Aviagen poster - Male Assessment in Production.

MONITORING EFFECTIVENESS

It can take 2 or 3 weeks for new males to establish themselves in the population. Gathering and analyzing farm and hatchery information regularly in the period after the males have been added is essential to determine success. Fertility levels must be checked closely to evaluate the effectiveness of the procedure and to determine whether further action is needed.

CONCLUSIONS

Male replacement can be used to successfully maintain flock fertility. There are different methods that can be used to achieve this, and the “correct” method will depend on company circumstances. However, there are a number of key areas which are important to ensure bird welfare and good biological performance, regardless of the method used.

- Biosecurity is of prime importance and any method of male replacement is a risk.
- Source flocks should test negative for pathogens such as Salmonella spp. and Mycoplasma (check local legislation).
- Optimal bird management during the rearing period. Ensure that stocking density in rear is not compromised.
- Mating ratios should be no higher than 10 males per 100 females in lay.
- Ensure that male to male aggression is not occurring when mature males are penned together.
- Immature males should not be mated with mature females.
- Ensure that male frame size and weight are appropriate.
- All males must have adequate feeder and drinker space.
- Replacement males must be marked to allow them to be monitored and weighed separately.
- Analyze farm and hatchery information, as well as fertility levels to evaluate the effectiveness of the male replacement.

Aviagen and the Aviagen logo are registered trademarks of Aviagen in the US and other countries.
All other trademarks or brands are registered by their respective owners.