

# Achieving and Maintaining FERTILITY in Broiler Breeders

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## Infertility...Male or Female Problem?

- It could be both...
- However, if an egg is laid...the "potential" fertility is always there.
- Males, may be or may become "impotent"

## Infertility...

- In females mostly due to: Over-feeding and obesity
- In males mostly due to: Over-feeding and under-feeding

## Infertility...

- If a hen produces an egg... infertility may be due simply to absence of semen in oviduct...(most common case)
- This in turn may be due to:
- Mating frequency or mating success.

**That's why males are more critical but often overlooked.**

## Fertilization

### A fertile egg

1. Must have gone through a fusion of male and female gametes.
2. Must have a properly developed embryo at oviposition.

## Fertilization... When / How It Happens ?

- Sperm : egg interaction:
- After copulation, small % of spermatozoa enter the sperm storage tubules (utero-vaginal junction).
- Spermatozoa are released around 30% per day, to the infundibulum during 10 minutes around ovulation  
>>>> fertilization ? ?
- During the 10 minutes ovum moves down and secretions involve it, preventing any more sperms to attach

## Fertilization... When / How ?

- Only the pronucleus of one spermatozoa is allowed to fuse with the female gamete at the center of germinal disc (4 – 5 hours)
- Number of holes in perivitelline membrane is important.
- How many spermatozoa are required? A total of approx. 1000 around de ova ...with 6 holes around the germinal disc.

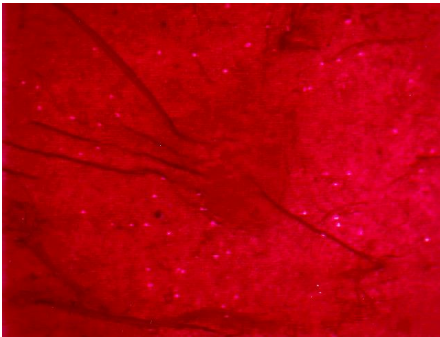
### Fertilization ...When / How ?

- Surprisingly, this process is incredibly efficient...
- Under most conditions fertility level reaches over 90% ...
- However... the % of infertile eggs can be of significant economic importance.
- Highest fertility is the result of good rearing and adult period management of males and females.

### Perivitelline Membrane (IPVL) Penetration

- Spermatozoa "tunnel" into the germinal disc area using proteolytic enzymes.
- Then, oviductal secretion form the OPVL to prevent to excess sperm activity in the area.
- Fertilization depends on good quality semen (sperm count, motility).
- Supplied by a well developed male with optimum testicular growth (puberty, early adulthood).

## Evaluating Fertility



*IPVL technique  
shows number of  
spermatozoa that  
penetrate ova ... only  
ONE reaches  
gamete fusion.*

## Hatch and Fertility

### Average hatchability

- 85 – 87 % Good
- 82 – 84 % Average
- 79 – 81 % Poor

### Starting Males

- At day old, males are smaller and less uniform than females. Smaller egg size.
- They have been doted, sometimes partially dubbed. More stress.
- First feed ingesta: critical x early intestinal development... long term consequences
- Use of light.

### Males: Growth Pattern Strategies

### Males. Beak Trimming

- Low B.W. target (breeder recommendations) is ideal. However, uniformity is critical. Used when equipment and density are optimum.
- Slightly Higher B.W. target (one week advance). May give better uniformity - longer legs, good keels.
- The Indicator is Uniformity: > 80% at all times.

- 7 – 10 days: touch
- 6 weeks: checking (at selection)
- 18 weeks: checking – critical for good mating balance >>> fertility

### Rearing The Males ( Feeding)

	0-4 wks	4-21 wks
CP %	20	15
ME (kcal/kg)	2800	2800
Ca %	0.95	0.90
Av.P %	0.44	0.40
Na %	0.20	0.20
Methionine	2% CP	M+C = 4% CP
Lysine	5% CP	

### Male Selection

- Objective: Optimize uniformity
- Selection:
  - At 6 weeks – to monitor / adjust growth pattern.
  - At 18 weeks – to transfer and mate the best: fleshing, legs, toes, beak, general conformation.

### GROWING PERIOD

#### Weight control targets

- Week 1: 120 g
- Week 2: 300 g
- Week 3: 450 g
- **Week 4: 600 g**
- Week 6: 880 g
- Week 12: 1,700 g
- **Week 20: 2,800 g**

**Objective: good skeletal development at 4-6 weeks**

### Male Sexual Development

Three Periods:

- **Pre-puberty: DO to 13-14 weeks.** Slow testicular growth, critical Sertoli cells multiplication >>> optimum sperm count depends on Sertoli cells determined at this age.
- **Puberty: 13-14 weeks >>> 24 weeks approx.** Rapid testicular growth... semen production begins.
- **Adult Phase: 25 weeks onwards.** Testicular growth completed by 30 weeks >>> remains same up to 40 weeks, then begins to shrink gradually

### Criteria In Males

### High Yield Males

- Monitoring Body Weight
- Body condition
- Controlling frame size
- Uniformity

- Requires long legs, bones and tendons, strong / straight toes, lean breast.
- Balance at copulation >>> male slide off the female >>> frustration >>> aggression >>> female mortality.

### Male Body Weight

#### Guidelines

- At 21 weeks ..... 2.9 kg
- At 29 weeks ..... 3.9 kg
- At 64 weeks ..... 4.8 kg

### Male Weight Gain

#### Growth

- 21 – 29 weeks ..... 18 g / day
- 29 – 44 weeks ..... 4 g / day

### "Window of Opportunity" (21-25 weeks)

**This period is critical... may determine good or bad persistency of fertility... males may have access to female feed...B.W. out of control...**

- Weekly body weight gain 110 – 135 g
- Weighing / handling weekly
- Grill / Dubbing ? high profile (43 mm in width, 70 mm height max. for full comb males  
For dubbed males grill height to be 60 mm max.)
- Full comb (or partial) ?
- "Nose-bar" ?

### Males Breast Fleshing

**24-27 weeks:**

### Fertility and Weight Gain

- If 21 – 29 week growth not achieved, then no persistency of fertility.
- Occurs with both over or under weight males.

### Feed allowances... how much ?

- Maintenance represents largest feed need
- Each kg of body mass needs 35 gr feed for maintenance
- >>> a 3 kg male needs 3 x 35 = 105 g for maintenance (@ 25°C)

### How much feed ?

Total feed need for 3 kg male @ 25°C growing at 18 g/day and feed diet with 2800 kcal/kg...

Maintenance 105 g

Growth 40 g

=====

**Total 145 g**

### Feeding Males (35-64 weeks)

- Slow growth, majority of feed is for maintenance.
- If males are overweight 200-400 g reduce feed intake by 5 g/bird/day.
- If males ate overweight > 500 g, use low nutrient density diet.

### Males Breast Fleshing

**32 – 40 weeks**

- a) 10 - 15 % Slight "U" shape
- b) 10 – 15 % Slight "Y" shape
- c) 70 – 80 % "V" shape

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- b) 10 – 15 % "V" shape
- c) 70 – 80 % slight "U" shape
- 52 weeks >>> Majority "U" shape

**Male – Female Ratio**

- 21 weeks – peak 9 – 10 %  
(aggression ?)
- Peak – 65 weeks 8 – 9 %
- Spiking add 2 – 3 %  
(45 weeks...)

**Potential Performance**

Age wks	% Fertility	% Hatch
26	87 – 90	77
30	96 – 97	85
32	96 – 97	88
36	97 – 98	91
40	97 – 98	90
50	95 - 97	87
55	94 - 95	85
60	90 - 92	82
65	90 - 92	80

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