Improving gait in ducks and chickens

Effects of selection on leg morphology and function

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Increased growth rates are associated with gait problems

Semi-aquatic birds represent an interesting compromise in leg design
Aims

- Assess changes in leg morphology
- Assess changes in gait
- Develop a more objective method of assessing gait within breeding programmes
Methods

- Divergent lines of chickens and ducks
- Leg morphology and gait measured

Birds measured at 3, 5 & 7 weeks of age
Growth rates
Bone morphology by CT
Early leg growth in ducks

Duck legs reach adult size by 5 weeks
Bone curvature

Ducks legs curve inward, moving feet medially
Duck bones, which are relatively stronger, have irregular cortical arrangement.
Foot angle at 7 weeks

Duck feet turn inwards

7 week broiler

Broiler
Layer
Pekin
Mallard

Curvature (°)

Broiler
Layer
Pekin
Mallard

Foot angle (°)

Broiler
Layer
Pekin
Mallard

Foot angle at 7 weeks

n=6

Duck feet turn inwards
Step width at 7 weeks

Heavier lines have wider steps

- Broiler
- Layer
- Pekin
- Mallard

n=6
Foot support at 7 weeks

Heavier lines spend more time on both feet

n=6
Will a more focussed visual gait score lead to higher heritabilities?

5000 pedigreed birds were scored using both the standard visual gait score and gait components.

Gait components have heritabilities which are as good or better than the standard gait score.
Conclusions

• Ducks may not be ideally adapted for walking on land

• Gait has changed through selection
  - but the ‘ideal’ gait is unknown

• Gait components have better heritabilities than the overall gait score
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Velocity at 7 weeks

Each line has its own ‘comfortable’ velocity range