THE SCIENTIFIC BASIS FOR HIGHER WELFARE BROILER HYBRIDS

AARHUS UNIVERSITY
DEPARTMENT OF ANIMAL AND VETERINARY SCIENCES

EUROPEAN PARLIAMENT ANIMAL WELFARE INTERGROUP MEETING
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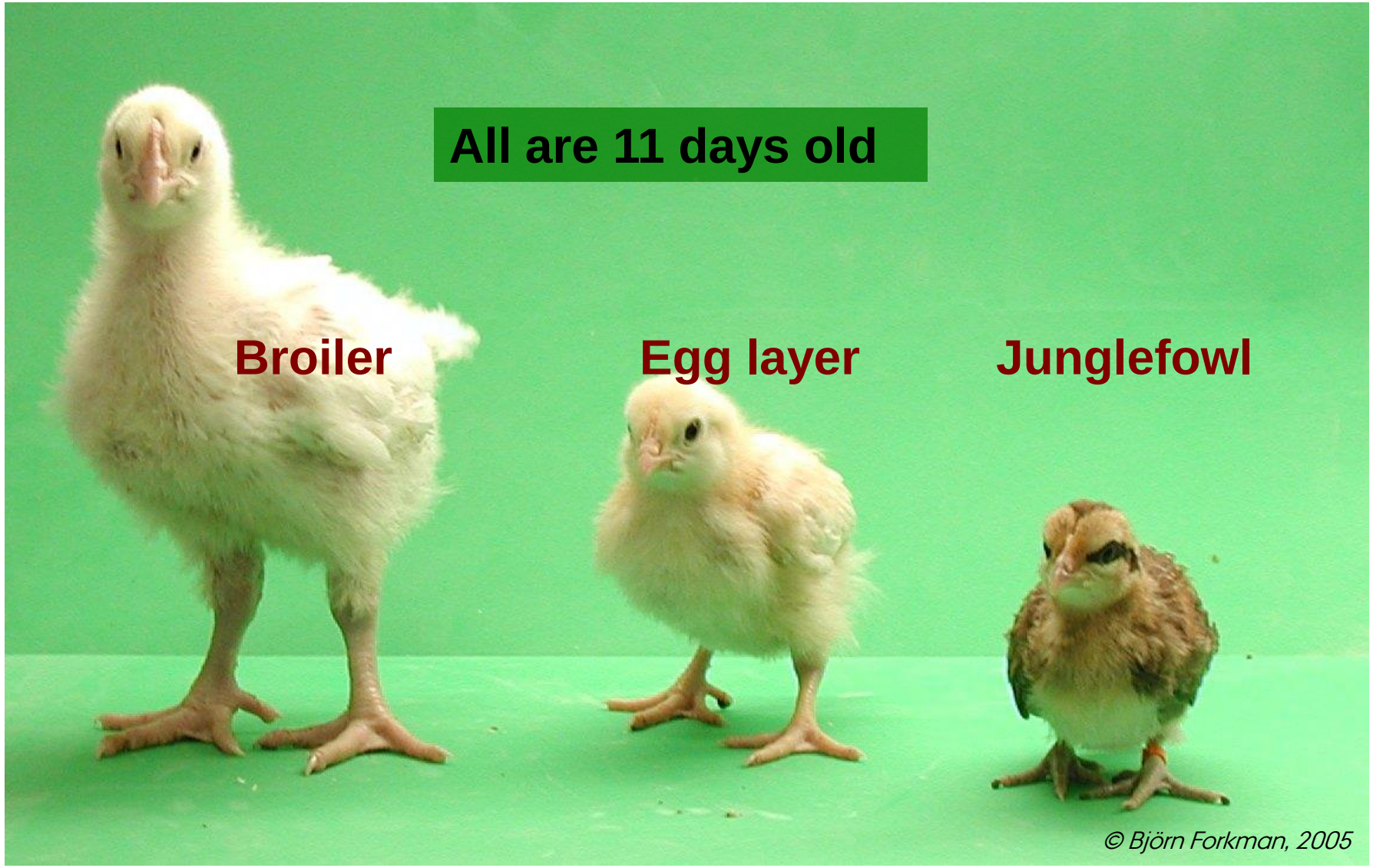
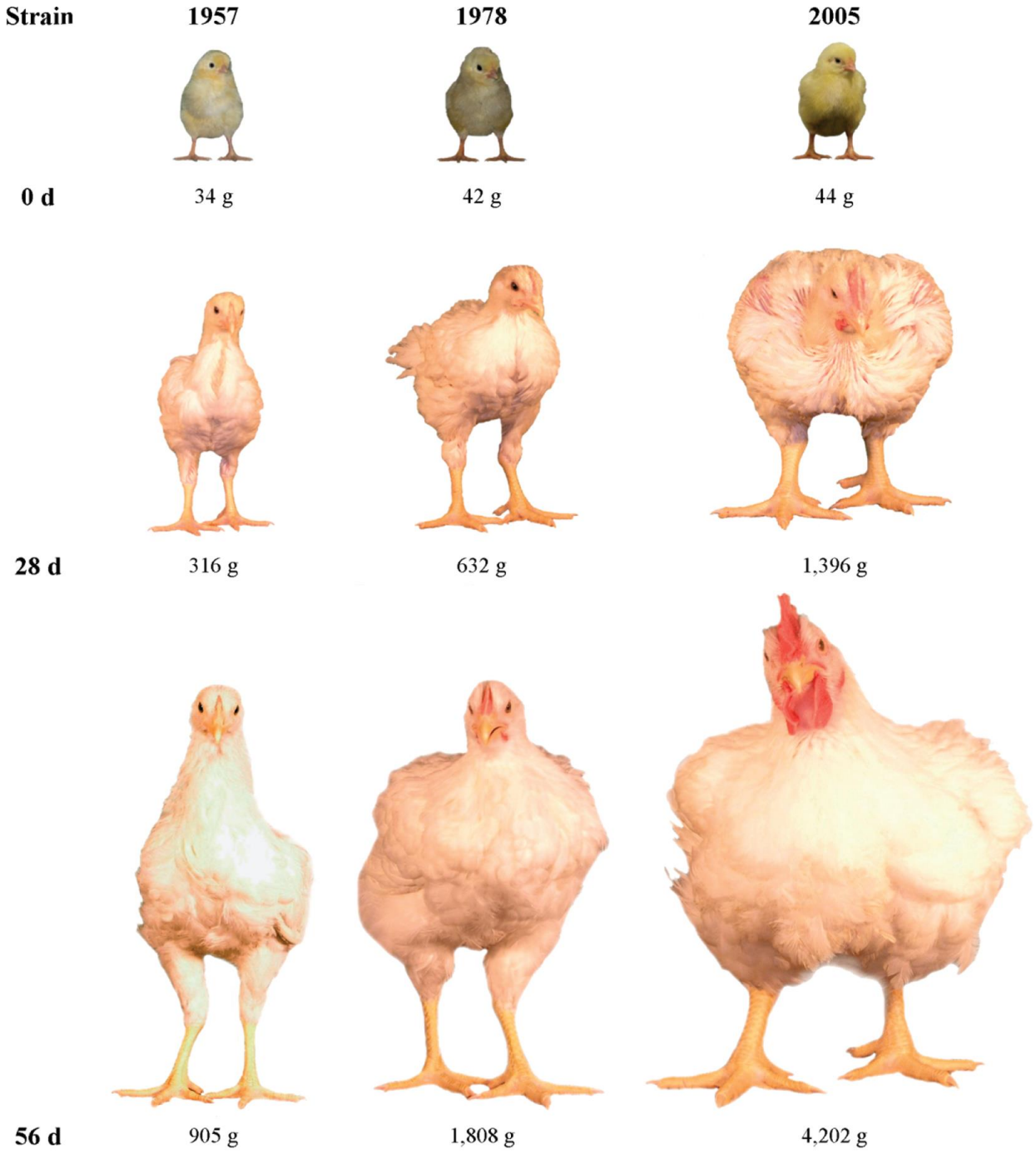
CONTENT

- Origin of the broiler
- Genetic selection for faster growth
- How slower growth rates improve broiler welfare
- Breeders – not to forget!
- Slower-growing broiler hybrids available on the market
- Summing up according to concerns for animal welfare
- Conclusions

ORIGIN OF THE BROILER





GENETIC SELECTION FOR FASTER GROWTH

	1957	1978	2005
Growth rate (g/day)	15.6	31.5	74.3

=> **376%** increase in growth rate

Fast growing hybrid in year 2022:
body weight at 56 days: 4318 g
Growth rate: 76 g/day

(Zuidhof et al., 2014)

The faster the growth rate, the poorer the animal welfare

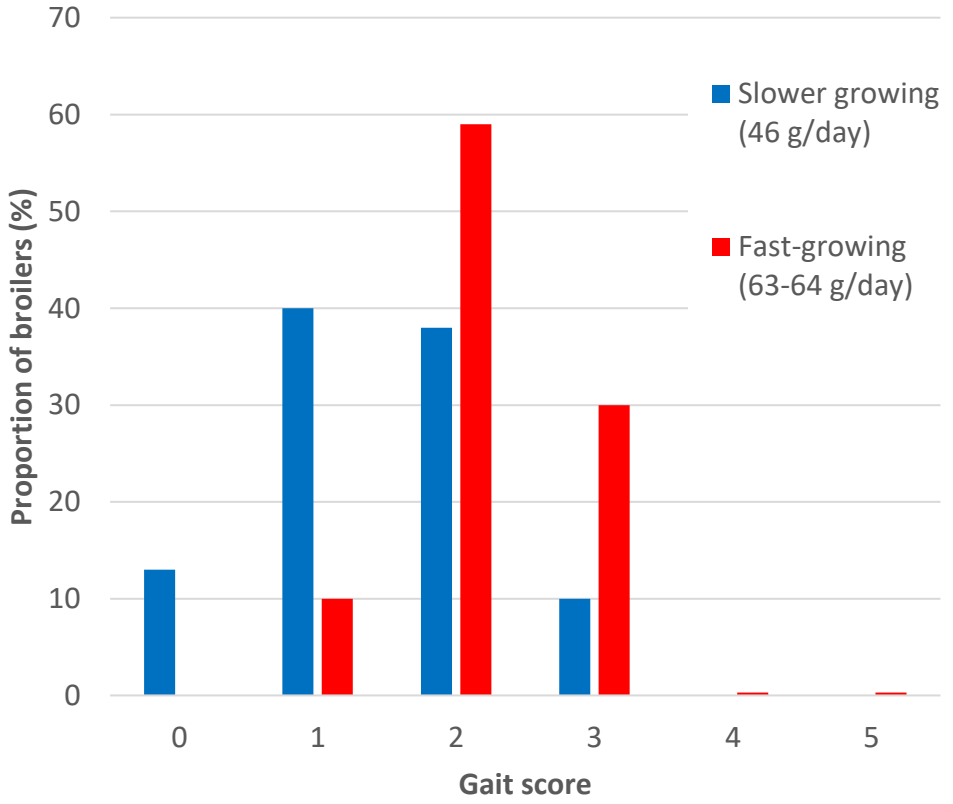
Broiler hybrids with slower growth rates show improved welfare

WALKING ABILITY AND LEG HEALTH

Broilers with slower growth show:

- Improved walking ability *(e.g. Kestin et al., 2001; Knowles et al., 2008; De Jong et al., 2012; Tahamtani et al., 2018; Dixon, 2020; Wilhelmsson et al., 2019; Rayner et al., 2020; Santos et al., 2022)*

- Better leg health, which improves walking ability and likely reduces associated pain, frustration and fear
  - Bacterial chondronecrosis with osteomyelitis *(McNamee et al., 1999; Wideman Jr et al., 2013)*
  - Tibial dyschondroplasia *(Fanatico et al., 2008; Shim et al., 2012)*
  - Varus valgus deformity *(Leterrier et al., 1998; Shim et al., 2012)*



(Modified from Dixon, 2020)

CONTACT DERMATITIS

Broilers with slower growth show:

- Improved mobility → Less time in a sitting position with hocks and breast in contact with the litter
- Higher foraging activity → Higher turn-over of litter → Slower deterioration of litter quality

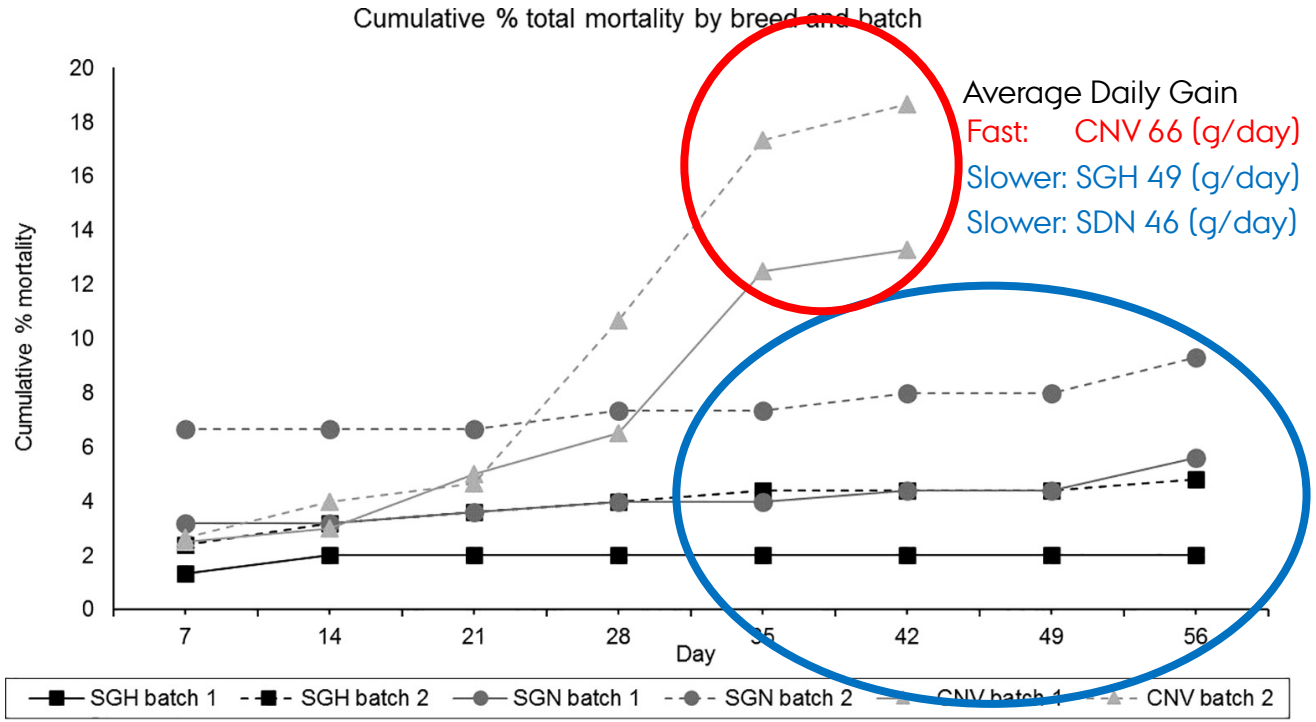
→ **Less contact dermatitis**

(E.g. Kjaer et al., 2006; Allain et al., 2009; Castellini et al., 2016; Yamak et al., 2016; Steenfeldt et al., 2019; Wilhelmsson et al., 2019; Rayner et al. 2020; Dixon, 2020; Santos et al., 2022)

CARDIOVASCULAR HEALTH AND MORTALITY

Broilers with slower growth have:

- Fewer changes in the muscles:organs ratio caused by genetic selection *(Havenstein et al., 2003)*
- Reduced risk of
  - Cardiac rhythm disturbances *(Olkowski, 2007)*
    - Sudden death syndrome *(Grashorn and Classen, 1993)*
    - Ascites *(Boostani et al., 2010; Rayner et al. 2020)*
  - Mortality, incl. fewer birds found dead and fewer culls
    (Castellini et al. 2016; Dixon., 2020; Rayner et al., 2020; Abeyesinghe, et al., 2021)



(Abeyesinghe, et al., 2021)

SUSCEPTIBILITY TO HEAT STRESS AND BREAST MUSCLE MYOPATHIES

Broilers with slower growth have:

- Lower heat production due to their lower metabolism.
  - Reduced risk of heat stress and mortality during high temperatures *(Lin et al., 2006; Deeb and Cahaner, 2001; Yalçin et al., 2001; Cahaner and Leenstra,1992; Berrong and Washburn, 1998; Soleimani et al., 2011)*

- Reduced risk of breast muscle disease and therefore likely experience less muscle weakness and less long-lasting discomfort
  (Kuttappan et al., 2012; Kijowski et al., 2014; Lorenzi et al., 2014; Dixon, 2020); but limited research on welfare implications: Norring et al., 2019; Riber et al., 2021)

(Bailey et al., 2020)

FIGURE 1 | Breast fillets showing the novel myopathies white striping (WS; left), wooden breast (WB; middle), and spaghetti breast (SB; right).

ACTIVITY AND MOTIVATED BEHAVIORS

Broilers with slower growth show:

More

positive

- Total activity
- Walking
- Foraging
- Perching
- Play

Less

- Total inactivity } negative
- Sitting
- Feeding
- Drinking

- Less fearfulness

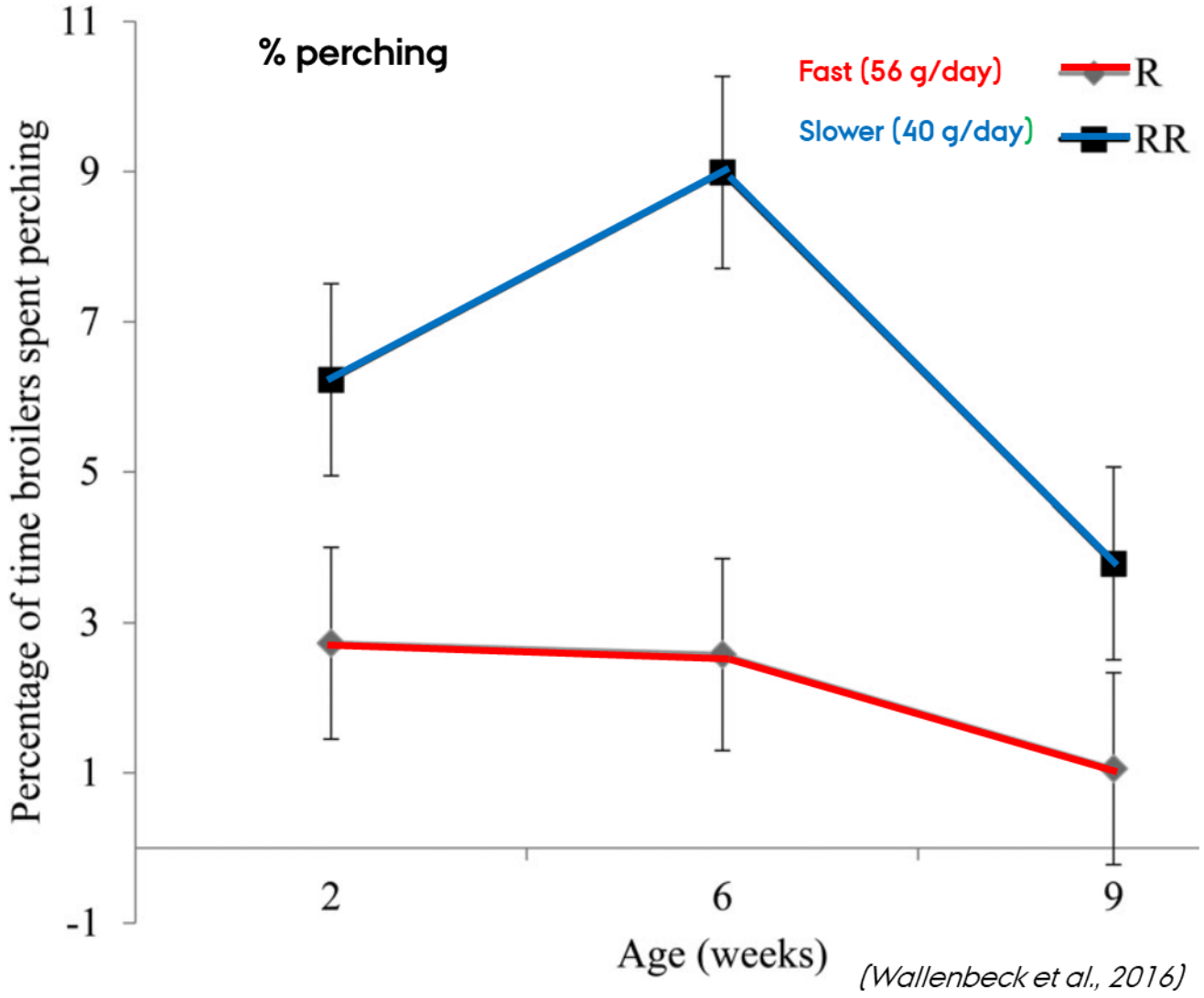
(Bokkers and Koene, 2003; Castellini et al., 2016; Wallenbeck et al., 2016; Dixon, 2020; Abeyesinghe et al., 2021)

ACTIVITY AND MOTIVATED BEHAVIORS

Broilers with slower growth make

- Better use of elevated structures and outdoor range area

(Nielsen et al., 2003; Castellini et al., 2016; Yngvesson et al., 2017; Malchow et al.. 2019; Rayner et al., 2020)



(Wallenbeck et al., 2016)

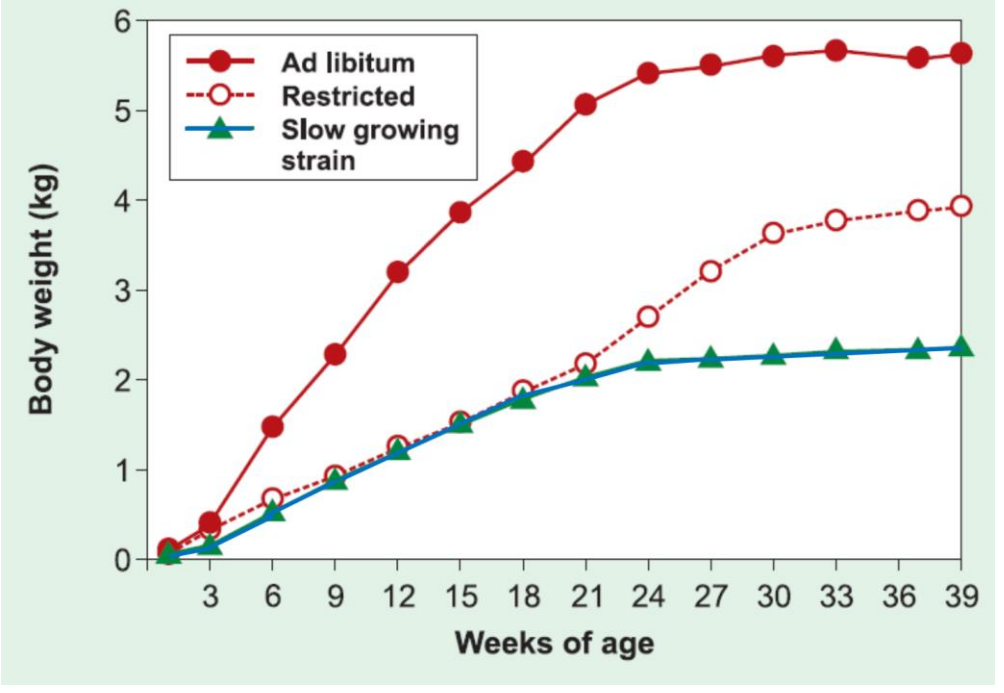
BROILER BREEDERS – NOT TO FORGET!

Slower growth also affects the welfare of breeders positively

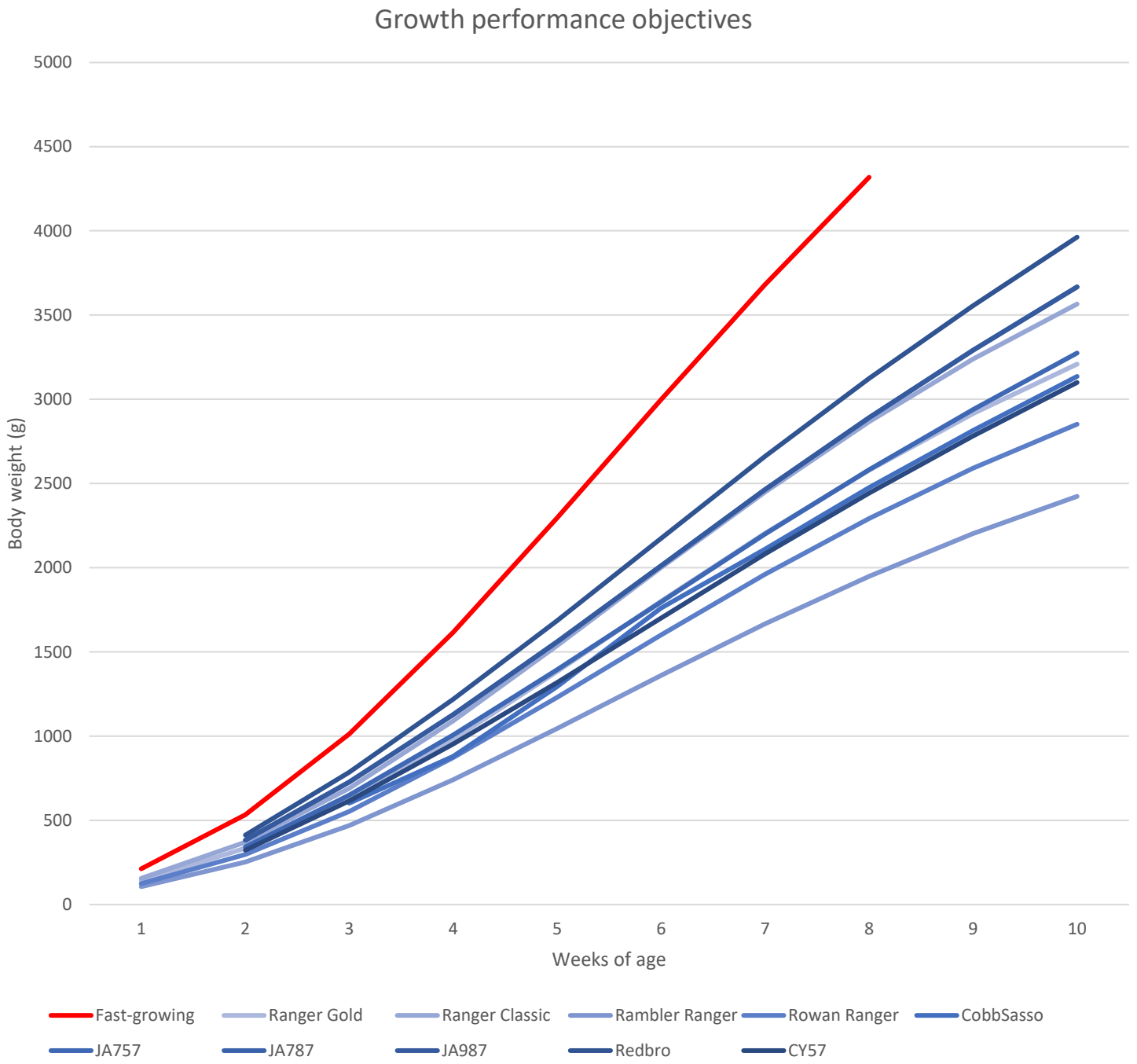
- Selection for faster growth => changed hunger regulation mechanisms => increased appetite *(Denbow, 1989; Siegel and Wolford, 2003)*
  - Feed restriction is therefore applied to avoid obese broiler breeders, resulting in hunger, frustration, stress, aggression, stereotypies, behavioural changes *(reviewed in Riber, 2020)*

Breeders with slower growth potential are subjected to less, if any, feed restriction and show improved welfare

(Heck et al., 2004; Jones et al., 2004; Decuypere et al., 2006; Puterflam et al., 2006; Decuypere et al., 2010; De Jong et al., 2012; Arrazola and Torrey, 2021)



BROILER HYBRIDS WITH DIFFERENT GROWTH RATES ARE AVAILABLE ON THE MARKET



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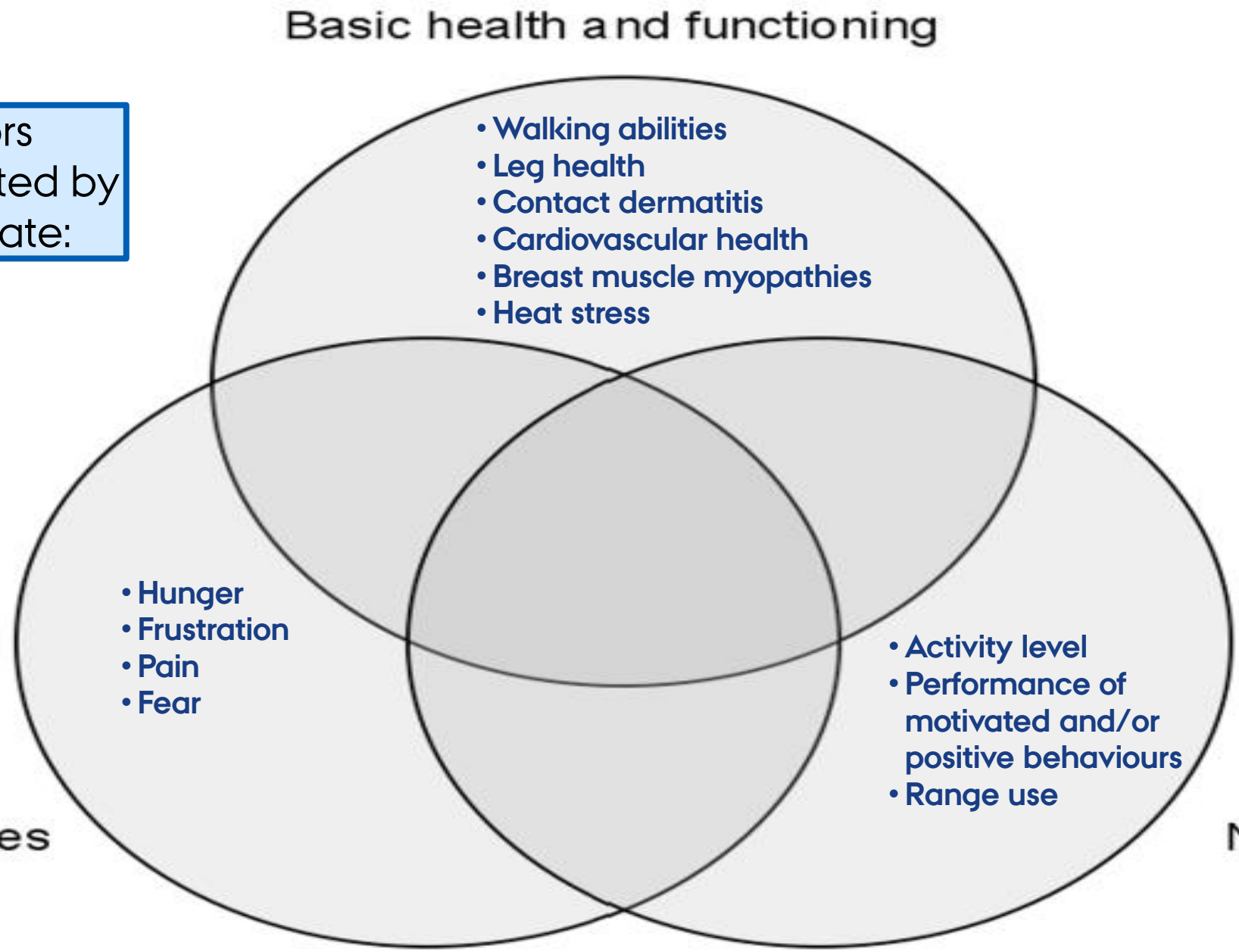
SUMMING UP ACCORDING TO CONCERNS FOR ANIMAL WELFARE

Welfare indiators positively affected by slower growth rate:



(Fraser, 2008)

CONCLUSIONS

- Overwhelming scientific evidence that returning to a more normal state by slowing the growth rate has a positive influence on broiler and broiler breeder welfare.
- Growth rate affects multiple welfare indicators within all concerns of animal welfare, i.e. basic health and functioning, natural behaviour and affective states.
- Generally, the slower the growth, the better the welfare (EFSA recommends <50 g/day).
- Slower growing hybrids differing in growth rates are already available on the market.

❖ Not only growth rate, but other aspects affected by the genetic selection may result in welfare improvements.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Questions?

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