



Analysis of Morphological Traits for Comparative Studies in Domestic Chicken Populations

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Breed diversity

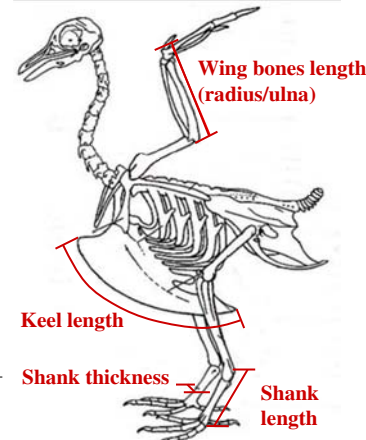


Data collection

- Body measures
- Weight

Derived traits:

- Shank shape = $\frac{\text{Shank Length (cm)}}{\text{Shank Thickness (cm)}}$
- Extremity shape = $\frac{\text{Shank Length (cm)}}{\text{Wing Length (cm)}}$
- Body shape = $\frac{\text{Keel Length (cm)}}{\text{Shank Length (cm)}}$
- Body proportion = $\frac{\text{Keel Length}^3 (\text{cm}^3)}{\text{Weight (g)}}$

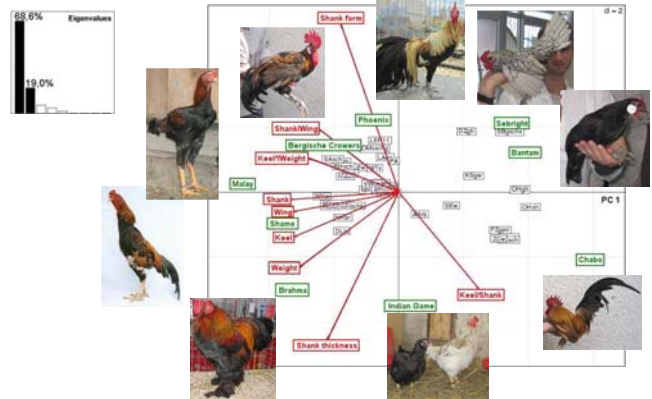
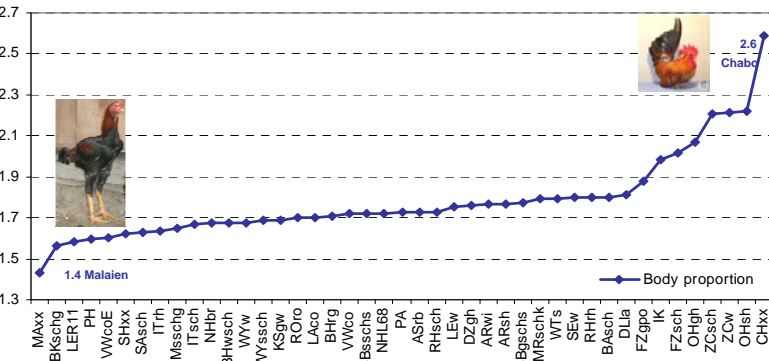


Sampled Populations

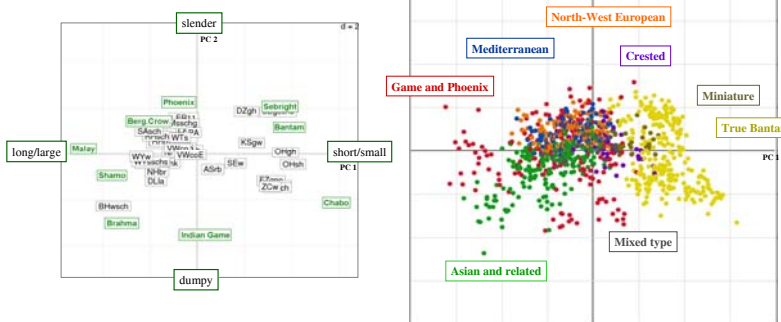
6 Populations of Game and related breeds	2 Populations of crested and related breeds	6 Populations of North-West European breeds	11 Populations of true bantam breeds
9 Populations of Asian type and related breeds	4 Populations of mixed type	4 Populations of Mediterranean type	1 Population of miniature breeds

Results

Population Means for Body proportion



Principal Component Analysis (PCA)



Conclusion

- Population means formed graphs with continuous increase for all traits.
- Population means showed large overlaps across examined populations.
 - Individual populations are not genetically isolated but part of the pool of chicken populations.
 - Extremes in shape, i.e. Chabo and Malay, were identified as significantly different from the other populations for shank length and body proportion.
- The 1st axis of PCA discriminates normal sized chicken from bantam/miniature.
- The 2nd axis separates populations on slender legs from those on dumpy legs.
 - The PCA highlights the most differentiating phenotypic characteristics and provides a synthetic typology of the populations.
- Body measures are best suited for identification of extremes.

Abbreviations

ARsh: Araucanas black, ARwi: Araucanas black breasted red, ASrb: Aseel red spangled, BASch: Rosecomb Bantam black, BHrg: Brahma partridge, BHwsh: Brahma light, BKSchg: Bergische Long Crower, CHxx: Chabo diverse color variants, mainly black tailed buff, DLla: German Favorolles, DZgh: German Bantam gold, FZgpo: Booted Bantam mille fleur, FZsch: Booted Bantam black, IK: Indian Game diverse color variants, ITrh: Leghorn dark brown, ITsch: Leghorn black, KSGw: Ko-Shamo wheat, LAcO: Lakenfelder, LER11: Leghorn white (experimental line), LEw: Leghorn white, MAxx: Malay red pyle and wheat, MRschk: Marans black copper, NHbr: New-Hampshire red, NHL68: New-Hampshire red (experimental line), OHgh: Ohiki red, OHsh: Ohiki silver, OMsschg: East Frisian Gull silver, PA: Poland diverse color variants, PH: Phoenix diverse color variants, RHrh: Rhinelanders red, RHsch: Rhinelanders black, RORo: Rholde Island Red, SASch: Sumatra black, SBgchs: Sebrigt golden, SBSchs: Sebrigt silver, SEw: Silkie white, SHxx: Shamo diverse color variants, VWco: Vorwerk, VWcoE: Vorwerk from conservation flock, WTs: Westfälische Totfleger silver pencilled, WYSchs: Wyandotte silver-laced, WYw: Wyandotte white, ZCsch: Pekin black, ZCw: Pekin white

Acknowledgements



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