Conformation recording as auxiliary trait for functionality and fitness in dairy goats

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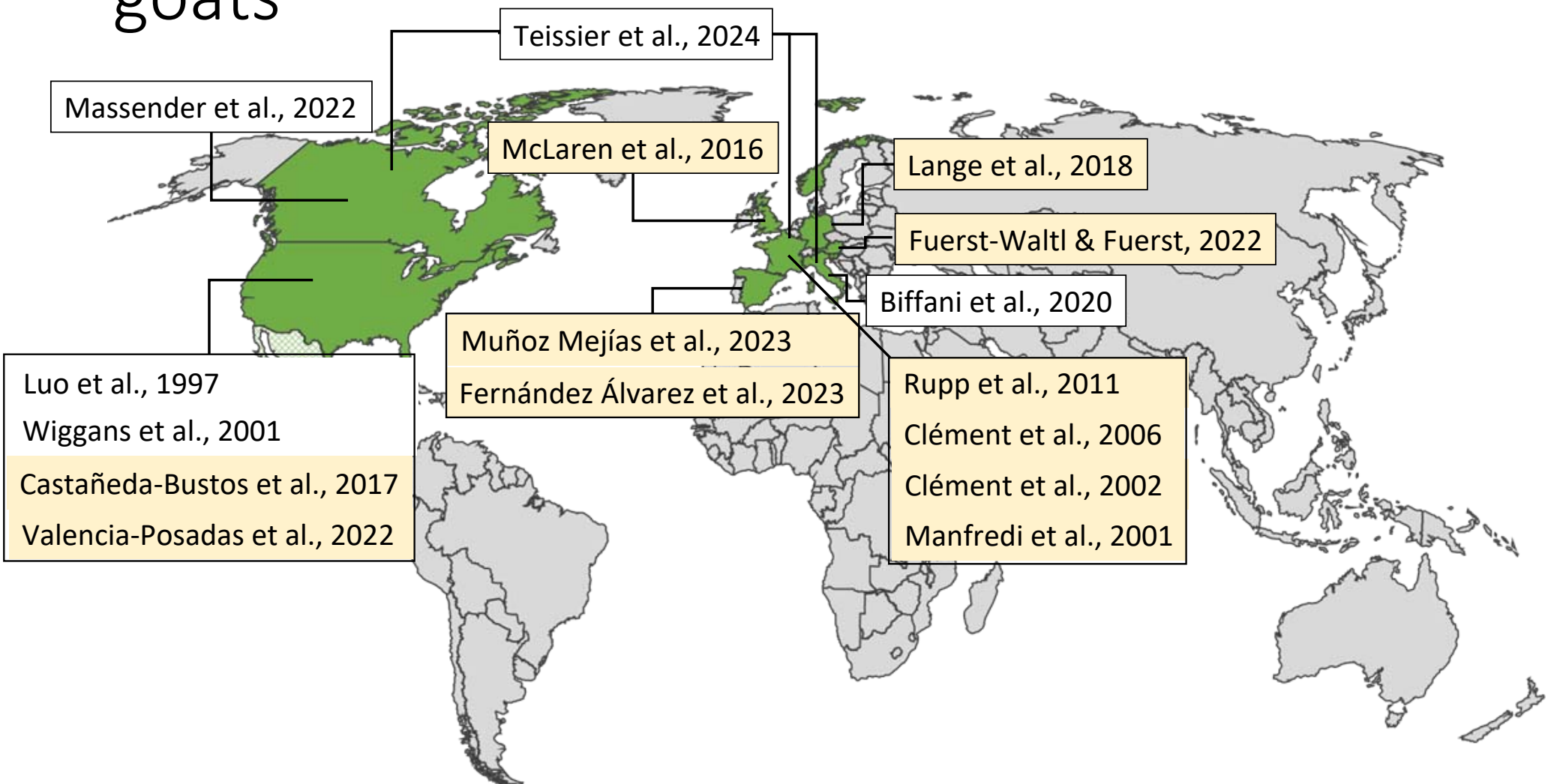
Agenda

- Importance of conformation traits and international standards
- Status quo of conformation recording in goats
  - Countries with conformation recording
  - What has been recorded so far: breeds and traits
  - Genetic parameters
- Conclusion and outlook

Importance of conformation traits and international standards

- Conformation traits play a major role for production, longevity and profitability (Massender et al., 2022; Castañeda-Bustos et al., 2017; McLaren et al., 2016)
- Conducting an objective conformation assessment is more complex than measuring productivity traits
- International standards for conformation recording ensure the equivalence of conformation recording and provide practitioners with description procedures that are backed up by scientific knowledge
- 1st ICAR guidelines for conformation recording in dairy goats were published in 2016

Status quo: Countries with linear appraisal in goats



Status quo: What has been recorded so far?

Country	Breeds	No of recorded conformation traits	Traits recorded in does and/or bucks	Age of recorded animals	Who is recording?
Austria	Gämsfarbige Gebirgsziege Saanen	19 scored, 5 measured	does	after 1st kidding, max. 24 months	Breeding organization
France	Alpine Saanen	11 -> 2 measured	11 traits in does, 1 trait in bucks (2 in AI bucks)	1st or 2nd lactation for does, 3-6 months for bucks	Breeding organization
Germany	German Fawn German White	23 -> 7 measured	does	1st lactation	State employees
Norway	Norwegian dairy goat	1	does	every lactation	Owner
Spain	Murciano-Granadina Florida Malagueña Payoya	17	does and bucks	mainly 1st lactation (14-24 month)	Breeding organization
UK	Yorkshire dairy goats (Composite breed)	10	does	mixed age	Owner

Status quo: Heritabilities (± SE, if available) of exemplary ICAR goat conformation traits

Trait	Heritability	Study
Stature	0.20 ± 0.02	Castañeda-Bustos et al., 2017
	0.76 ± 0.18	Lange et al., 2018
	0.18	Muñoz-Mejías et al., 2023
	0.72 ± 0.07	Valencia-Posadas et al., 2022
Rear legs set side view	0.20 ± 0.02	Castañeda-Bustos et al., 2017
	0.04-0.09	Fuerst-Waltl & Fuerst, 2022
	0.15 ± 0.10	Lange et al., 2018
	0.03	Muñoz-Mejías et al., 2023
	0.19 ± 0.09	Valencia-Posadas et al., 2022

Status quo: Heritabilities (± SE, if available) of exemplary ICAR goat conformation traits

Trait	Heritability	Study
Fore udder attachment	0.13-0.29	Biffani et al., 2020
	0.25 ± 0.02	Castañeda-Bustos et al., 2017
	0.09-0.26	Fuerst-Waltl & Fuerst, 2022
	0.11 ± 0.10	Lange et al., 2018
	0.26-0.33	Manfredi et al., 2001
	0.26 ± 0.02	Massender et al., 2022
	0.15 ± 0.04	McLaren et al., 2016
	0.23	Muñoz-Mejías et al., 2023
	0.30 ± 0.01	Rupp et al., 2011 (Alpine)
	0.25 ± 0.02	Rupp et al., 2011 (Saanen)
	0.13 ± 0.08	Valencia-Posadas et al., 2022
	0.25	Wiggans & Hubbard, 2001

Status quo: Genetic correlations (± SE, if available) of exemplary ICAR goat conformation traits with production, health and functional traits

Traits	r_G	Study
Milk yield (305d) with udder furrow	−0.25 ± 0.13	McLaren et al., 2016
Milk yield (305d) with udder depth	−0.71 ± 0.08	McLaren et al., 2016
Milk yield (305d) with udder attachment	−0.28 ± 0.17	McLaren et al., 2016
SCS with udder floor position	−0.24 ± 0.03	Rupp et al., 2011
SCS with teat length	0.29 ± 0.03	Rupp et al., 2011
SCS with teat width	0.34 ± 0.03	Rupp et al., 2011
SCS with teat form	−0.27 ± 0.03	Rupp et al., 2011
Fore udder attachment with functional productive life at 72 month of age (FPL72)	0.37 ± 0.09	Castañeda-Bustos et al., 2017
Udder depth with FPL72	0.36 ± 0.10	Castañeda-Bustos et al., 2017

Conclusions

- From 4 countries in 2016, there are now 10 countries with linear appraisal
- Importance of the ICAR standards increases with extension of linear appraisal in different countries
- Studies show that all of the traits proposed by ICAR are heritable
  → traits can be improved by selection
- Negative or null correlations between conformation traits and milk yield

  AND
- Morphological traits are genetically favourably correlated with somatic cell count

→ ***Selection on conformation traits improves udder health***

- Positive correlations between conformation traits and productive lifetime

→ ***Selection on conformation traits improves functionality and fitness***

Outlook on ICAR guidelines

Trait group	Keep	Skip	New
Udder traits	Fore Udder Attachment Central Ligament Rear Udder Width Udder Depth Teat Placement rear view Teat Length Teat Form	Rear Udder Height	Teat Orientation rear view Teat Orientation side view
Leg traits	Rear Legs Set rear view Rear Legs Set side view Front Pasterns side view Hind Pasterns side view	Locomotion	Feet Angle Opening
Frame traits	Stature Body Depth Rump Angle Loin Strength Angularity	Chest Width Rump Width	Chest Circumference

Thank you for the interest

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