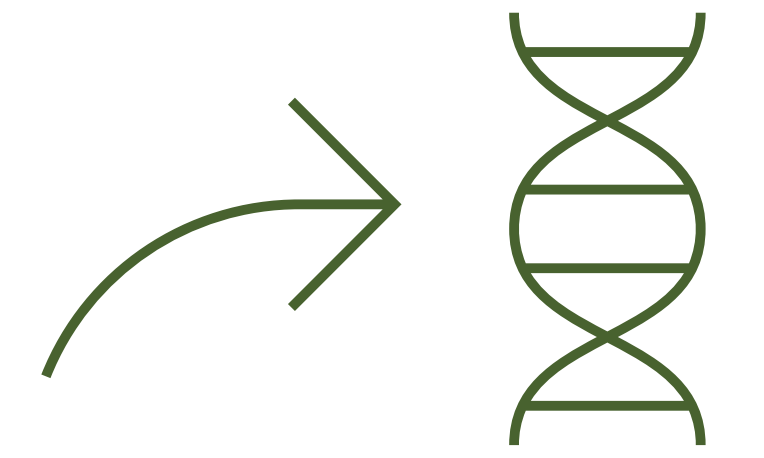


Reaching expert consensus on demand-led Legume Breeding in Europe: A multi-stage Delphi study

Lars Wernze and Marcus Mergenthaler South Westphalia University of Applied Science, Germany

Demand led breeding (DLB)^{1,2,3}:

- Concept to improving crops in which breeding priorities are systematically aligned with the needs and preferences of various stakeholders throughout the agricultural and food value chain
- Addressing functional and qualitative traits that are important beyond primary agriculture
- Value chain / stakeholder-oriented governance system



Methods:

Research question:

- Can a consensus be reached among breeding experts regarding the evaluation of the DLB approach and its potential relevance and implementation in European legume breeding?

Research design:

- Delphi Study according to HÄDER and HÄDER⁴ with legume breeding experts: Multi-stage panel survey
- Semi-standardised online questionnaire
- Analysis using content analysis, descriptive statistics and paired Wilcoxon signed-rank test (p_w)

| Country | FR | BE | IT | ES | BG | DE | CZ | NL | DK | NO | RS | LT | LBN | CH | Total n |
|----------|----|----|----|----|----|----|----|----|----|----|----|----|-----|----|---------|
| Wave 1 n | 1 | 1 | 1 | 3 | 1 | 1 | 2 | 1 | 1 | 1 | 3 | 1 | 1 | 1 | 19 |
| Wave 2 n | 2 | 1 | 1 | 3 | 1 | 1 | 2 | 1 | 1 | 1 | 3 | 1 | 1 | 1 | 20 |
| Wave 3 n | 3 | 1 | 1 | 3 | 1 | 1 | 2 | 1 | 1 | 1 | 3 | 1 | 1 | 1 | 21 |

Table 1: Overview of the countries in which the participants of the study are professionally active and the number per round

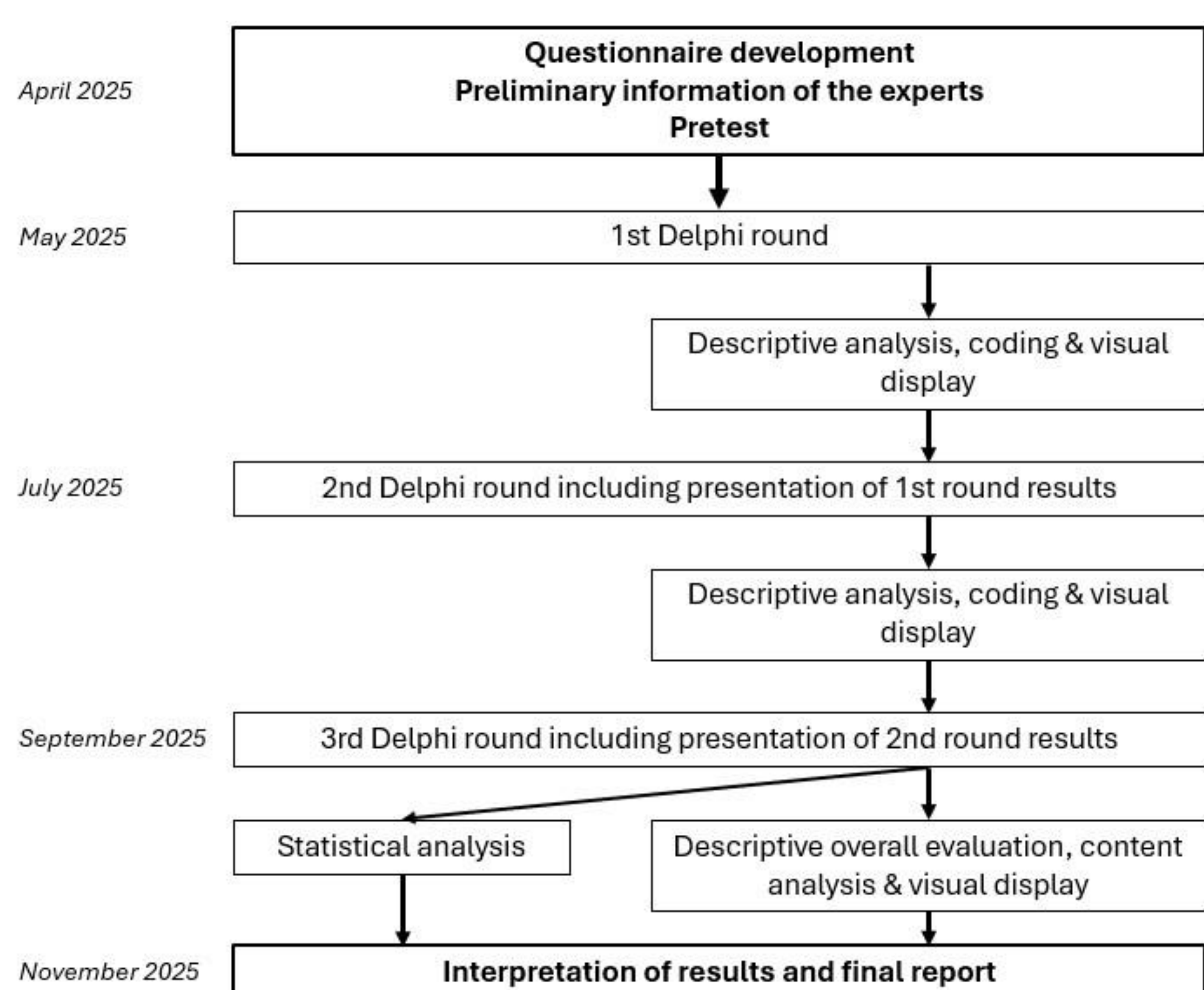


Figure 1: Schematic flow and procedure of our Delphi study

Results:

- Consensus on the benefits of the DLB approach, against the background that improved legumes can also improve the profitability of breeding
- However, DLB also comes with the risk of failing to meet demand in time, as well as uncertainty regarding the success of a particular variety innovation.

“The needs and expectations of the customers are very important from a practical point of view. The traits that are most valued by them give the main directions of the basic research and breeding programs that are followed when a new variety is developed.”

„Greater alignment to specific needs should correspond to an extra commercial value assigned by the market to the product of the variety.“

„There is no guarantee that a new variety will generate sufficient profit, even if the needs of all downstream stakeholders are carefully considered. No strategy can ensure the high profitability of a new variety, regardless of how meticulously it is developed.“

„We receive some feedbacks, but this is fragmented. It is necessary to have a more organized communication to align breeding efforts with the real needs“

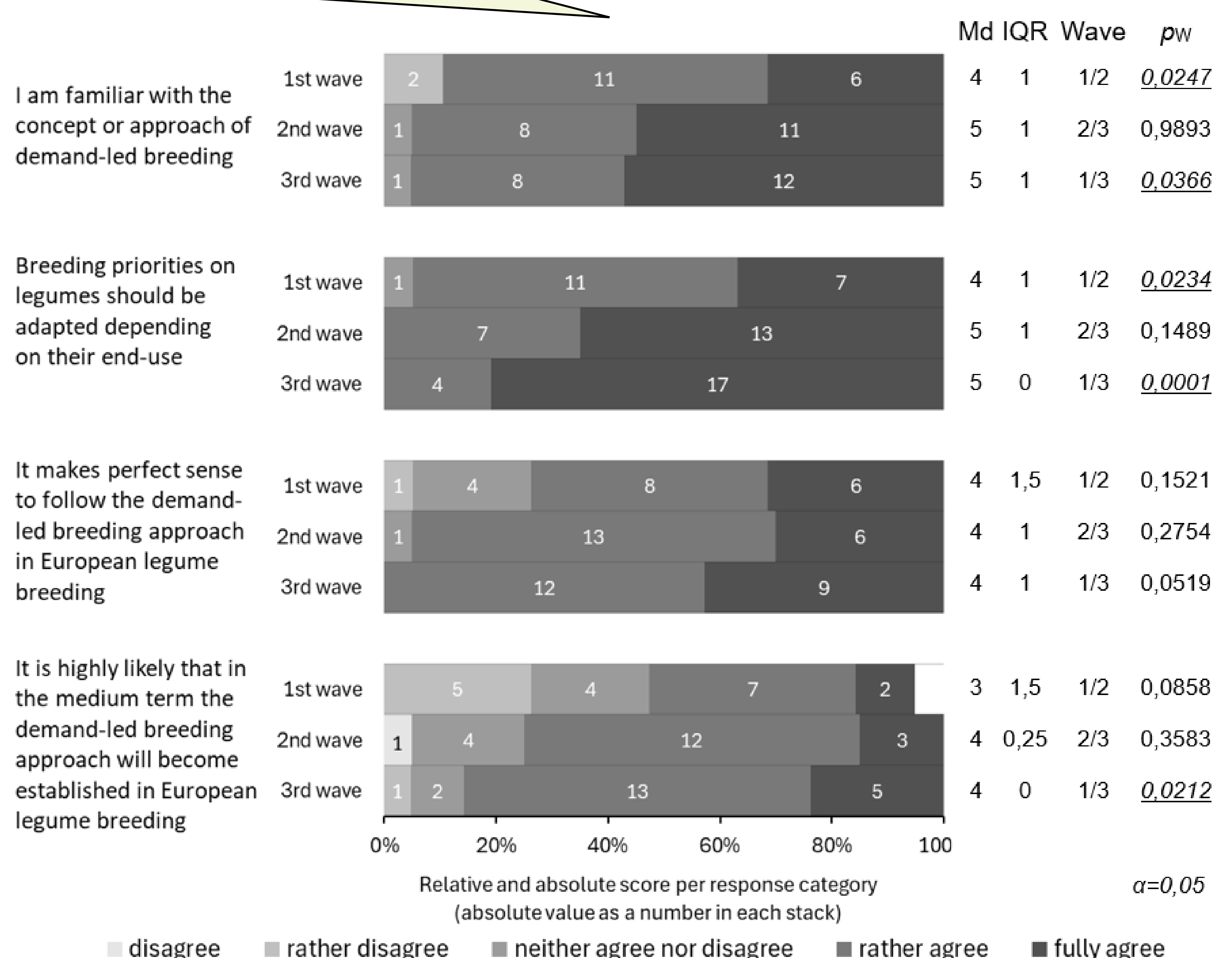


Figure 2: Display of all responses in relative and absolute numbers as stacked bars per wave and closed question regarding the DLB assessment. In addition, a table showing the median (Md), the interquartile range (IQR) and the p-value of the paired Wilcoxon signed-rank test (p_w) for each wave pair.

Conclusions:

- Demand led breeding needs stronger cooperation between breeding, agriculture, processing, trade and end markets
- DLB should be seen as a guiding principle that induces smooth improvements whilst taking existing needs into account within existing breeding programmes

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²DONOVAN, J., RUTSAERT, P., SPIELMAN, D., MASHISIA SHIKUKU, K. and DEMONT, M. (2021): Seed value chain development in the Global South: Key issues and new directions for public breeding programs. Outlook on Agriculture, Volume 50. <https://doi.org/10.1177/00307270211059551>

³RAGOT, M., BONIERBALE, M. and WELTZEL, E. (2018): From Market Demand to Breeding Decisions: A Framework. CGIAR Gender and Breeding Initiative. GBI Working Paper. No. 2, Lima. <https://hdl.handle.net/10568/91275> (28.04.2026)

⁴HÄDER, M. and HÄDER, S. (2022): DELPHI-Befragung. In: Baur, N. and Blasius J. (Ed.), Handbuch Methoden der empirischen Sozialforschung, Springer VS, 3rd edition, Wiesbaden.