chain omega-3 fatty acids (EPA and DHA; animal source only) are major components of the brain and interact with vitamin B12 in brain health. Productive animals are almost irreplaceable for maintaining a circular flow of materials in which native grasslands co-evolve with livestock, by recycling in various ways large amounts of inedible biomass, which is generated as by-products during the production of food for the human diet. Ruminant livestock are also in an optimal position to convert these raw materials back into the natural cycle while producing high-quality food. Well-managed livestock systems that apply agroecological principles can generate many other benefits, such as carbon sequestration, improved soil health, biodiversity conservation, watershed protection, and the provision of important other ecosystem services. These production systems are one of the few that achieve food production using native grasslands while conserving rich ecosystems with a high degree of integrity and functionality. Ethical animal production systems are possible by following key scientific principles and by being certified to humanely raised and handle animal protocols. In this controversial context, among others, robust scientific evidence is required as well as an active and efficient communication strategy to inform and engage policymakers and consumers. In the new reality, future livestock systems and value chains need to be rethought and transformed to convert these challenges and social concerns into opportunities to align o align interests and beliefs between producers and consumers. These issues are analyzed and discussed at this conference.

doi: 10.1016/j.anscip.2023.04.082

O82
The direct (meat) and indirect (organic fertilizers) contribution of beef cattle farms to food security

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Keywords
Crop-livestock integration; Farm clustering; N balance; Organic fertilizers; feed self-sufficiency.

Beef cattle show poor contribution to food security (here expressed as net protein productivity: (meat protein – ingested human-edible protein) per surface unit). Although, beside this aspect of "direct" food production, beef cattle also contribute indirectly to food security by delivering organic fertilizers maintaining soil fertility in cropping systems. The aim of this study was to analyze the relations between those two aspects, with as hypotheses that the level of crop-livestock integration was an influencing factor. We calculated annual indicators of contribution to food security, N use and crop-livestock integration using accounting data of 80 beef cattle farms (84 ± 49 ha of Agricultural Area (AA) and 116 ± 73 livestock units) of the Walloon region (Belgium) at the farm level (crop + livestock), on the one hand, and for both the crop and livestock subsystems, on the other hand. Nine variable were used to perform a kmeans clustering to highlight the main occurring four farm types. The two types showing a positive net-productivity at farm level are discussed thereafter. The type with the highest net productivity at farm level (78 kg Human Digestible Protein (HDP)/ha) had the highest share of crops (81% of AA) coupled with an intensive maize-based beef cattle (29% maize silage in the fodders) consuming 16% of the produced crops. The tillable area was composed of 14% of temporary grasslands. The livestock subsystem had a negative contribution to food security (−5.2 kgHDP/ha) coupled with a low feed self-sufficiency (76%), a high percentage of N fertilizers from mineral origin (71%) and a high N surplus (79 kgN/ha), both at farm level. The other farm type with a lower positive contribution to food security at farm level (19.5 kgHDP/ha) had a lower share of crops (47% of AA) coupled with a grass-based beef cattle (5% of maize silage in the fodders) consuming 36% of the produced crops while contributing positively to food security (3 kgHDP/ha). The tillable area was composed of 60% of temporary grasslands. This type of farm had a high feed self-sufficiency (95%), a low percentage of mineral N (22%) and a lower N surplus (10 kgN/ha). Hence, even if crop-livestock farms with a high share of crops contribute more quantitatively to food security at farm level, they depend on imported mineral N and feedstuffs, have a higher impact on the environment through N surplus coupled with a livestock subsystem that decreases food security. Crop-livestock farms with more balanced grass-based livestock-crop shares show lower imports of mineral N, lower environmental N-impacts and a self-sufficient livestock subsystem contributing positively to food security. By increasing crop-livestock integration (feed self-sufficiency, temporary grasslands, farm fertilizers optimization, . . .), this beef cattle farm type couples direct and indirect contribution to food security.

doi: 10.1016/j.anscip.2023.04.083

O83
Black-soldier-fly larvae: an eco-friendly solution for sheep, cow and laying hens manure management, besides insect protein and fertilizer production

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