Linking cattle nutrition to human nutrition:

A value chain approach to improving the production, handling, and consumption of animal source foods in Ethiopia

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- Texas Tech University: Dr. Mary Murimi
- Hawassa University: Dr. Kebede Abegaz

Objectives

1) Create a systems-based research approach that strengthens linkages between improved animal source food production and consumption practices and human nutrition outcomes in Ethiopia.

Efforts span research in forage, ruminant nutrition, meat science, dairy science, food safety, human nutrition, and gender.

Pigeon pea for Ethiopian cattle

Tefera Mekonen, Yunus Abdu, Adugna Tolera, Ajebu Nurfeta, Sintayehu Yigrem, Aklilu Mekasha, Jessie Vipham, and Barry Bradford

Introduction

- There is a lack of affordable protein supplements in Ethiopia.
- Pigeon pea (PEA) is a legume readily grown in Ethiopia.

Methods

1. Growing calves or lactating dairy cows were fed diets with PEA progressively replacing concentrate.
2. Agronomy study evaluated PEA plant spacing for optimal yield.

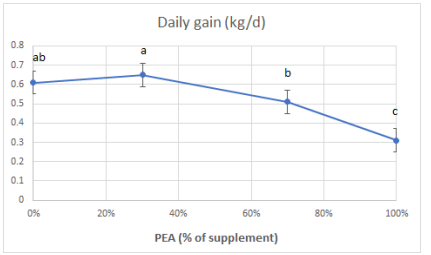
Results

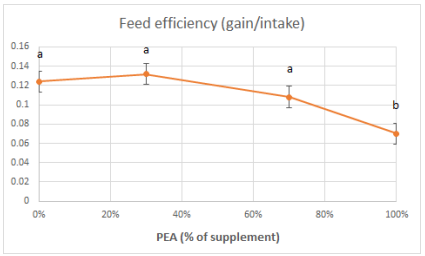
- Calves maintained growth with up to 30% PEA supplement.
- Cows mantained milk yield with up to 20% PEA supplement.
- Yield was optimized at 50 cm rows and 30 cm between plants.

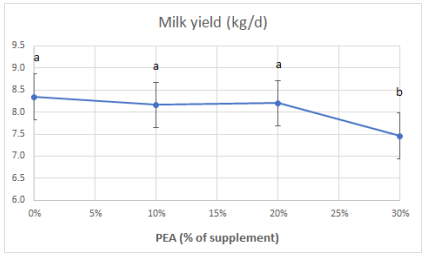
Recommendations

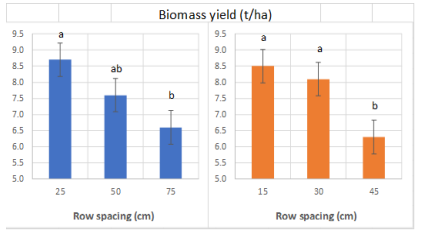
- Integrating PEA into crop plans can address cattle nutrient deficiencies while providing soil nitrogen.

Devoting 0.1 ha to **pigeon pea** production can replace **800 kg** of purchased **concentrate** without negative impacts on **growing** or **lactating cattle** productivity.









Prevalence of *Salmonella enterica* on Beef Carcasses in Ethiopian Abattoirs

Andarge Zelalem , Kebede Abegaz , Ameha Kebede, Yitagele Terefe, Tafesse Koran, Jessie Vipham

Introduction

- *Salmonella enterica* has been identified as a pathogen of global importance to public health.
- Cattle are natural reservoirs for *Salmonella enterica.*
- Ethiopians often consume raw beef as a part of their diet.

Methods

1. A total of 150 carcasses (450 sub-samples) were collected from abattoirs.
2. Samples were analyzed according to methods from the USDA-FSIS Microbiology Laboratory Guidebook 4.09.
3. Presumptive positives were confirmed utilizing BIOLOG.

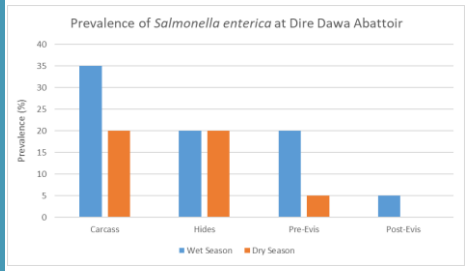
Results

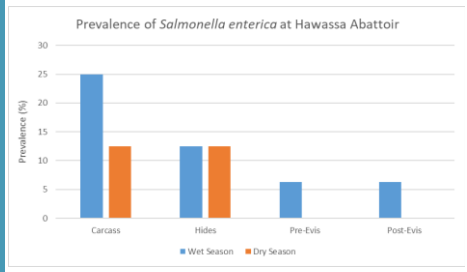
- A total of 45 *Salmonella enterica* isolates were collected from three abattoir facilities.
- The prevalence of *Salmonella enterica* was higher during wet season in all abattoirs.

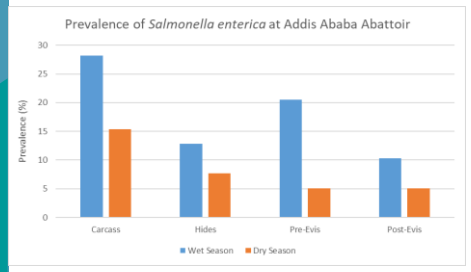
Salmonella enterica was present in all abattoirs during both season.

Carcass level data indicates that cross-contamination from hides is contributing to *Salmonella enterica* contamination of beef carcasses.

Figures







Recommendations

1. Training interventions should focus on cross-contamination during the slaughter process.
2. Infrastructure to support proper sanitation is needed.

Determinants and Constraints of Household Level Animal Source Foods Consumption in Selected Ethiopian Communities

Alemneh Kabeta, Mary Murimi, Kebede Abegaz., Dejene Kassa., Jessie L.Vipham

Introduction

- Animal Source Foods (ASFs) are valuable sources of nutrients like iron, zinc, calcium, vitamin A and vitamin B12, and easily digestible complete protein.
- Evidences on consumption behavior, constraints and determinants are limited in Ethiopia

Methods

1. Women (n=422) responsible for food preparation were randomly selected and interviewed for household level ASFs consumption frequency
2. Data were analyzed using descriptive statistics and Ordinal Logistic Regression

Participants in this study reported rarely consuming animal source foods …

- **92% reported not consuming poultry in the previous month.**
- **60% reported not consuming meat in the previous month.**
- **97.4% reported not consuming fish in the previous month.**
- **45% reported not consuming eggs in the previous month**
- **62% reported that they never consumed milk in the previous month.**

Constraints

- Most of the participants (70%) agreed that it is difficult to get meat where they usually shop, while a majority (80%) indicated that they cannot afford to buy meat
- Almost all (99.3%) of the respondents indicated that fish was not available where they usually shop, while slightly more than half (57.9%) reported that they could not afford to buy fish.

Determinants

- Food insecurity was a barrier to consumption of Animal Source foods. For example, food insecure households were less likely to consume poultry (p. =0.035), meat (p. <0.001), eggs (p. < 0.001), milk (p. =0.035) and milk products (p. =0.005) than food secure households .
- Poverty as determined by income or property ownership was a barrier to ASFs consumption. For example, households with an estimated annual income of 5000 ETB and less (p. = 0.013), 4-6 family size (p. = 0.031) and lack of chicken ownership (p. <0.001) were less likely to consume eggs once/day.
- Similarly, households that did not own cows (n=241) were less likely to consume milk or milk products (p. < 0.001) frequently (once/day) than those who owned cows.

Investigating Forage Sorghum in Ethiopia

Aklilu Mekasha, Doohong Min, Nathanael Bascom, Dustin Pendell, Asheber Tegegn, Jessie Vipham

Introduction

- Ethiopia has the largest livestock population in Africa, but the productivity is low mainly due to shortage of feeds in quality and quantity.
- Using sorghum as a case crop, a study was conducted in Ethiopia to identify determinants of use as feed, identify varieties, packages of production and use management, and to demonstrate to farmers.

Methods

- **Variety:** Multiple field experiments were conducted to identify promising sorghum varieties for forage yield and forage quality among both local land races and improved varieties.
- **Cultivation practice**: Field studies evaluated higher yielding dual purpose grain sorghum varieties for response to different seeding rates.

Stay green gene introgressed followed by normal grain varieties are superior in forage quality (In Vitro Organic Matter Digestibility, IVOMD) and may serve as promising forage sorghums (Figure 1 and 2).

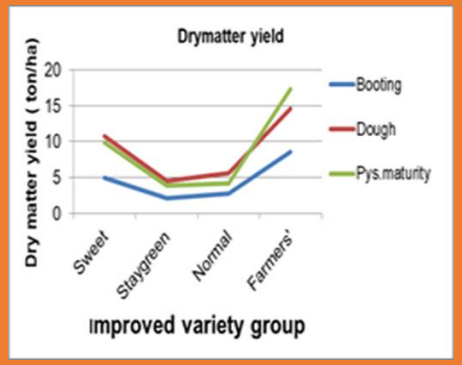


Figure 1. Forage yield content of improved varieties.

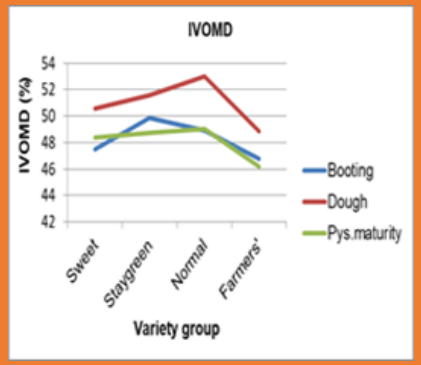


Figure 2. IVOMD content of improved varieties.

Increasing the seeding rates for dual-purpose sorghum varieties is a promising farm management strategy for increasing palatability (reduced stalk thickness) without significant effect on dry matter accumulation (Figure 3 and 4).

Results

- Field studies showed that grain varieties had higher forage quality, but lower dry matter accumulation when compared to local farmers' variety.
- Increasing the seeding rates for dual purpose sorghum varieties from 12.5 kg/ha to 100 kg/ha significantly decreased stalk thickness, and conversely increased plant stand count and IVOMD without significant effect on dry matter accumulation.

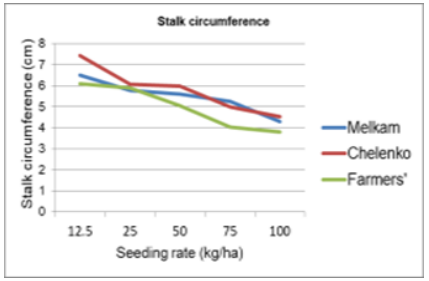


Figure 3. Forage yield content under deferments seeding rates.

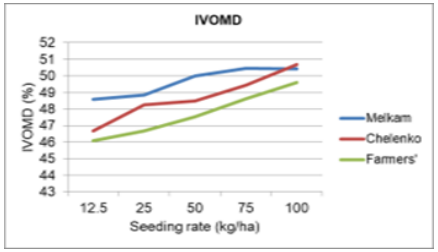


Figure 4. IVOMD content under deferments seeding rates.

Working towards unlocking adoption and use barriers to forage sorghum in Ethiopia

Aklilu Mekasha, Doohong Min, Nathnael Bascom, Dustin Pendell, Asheber Tegegn, Jessie Vipham

Introduction

- Adoption, use and contribution of forage cultivation is very low.
- The problem could emanate from lack of understanding adoption barriers, appropriate varieties, cultivation practices, post-harvest handling, processing, input supply and market linkages along value chain.

Methods

1. **Household Survey:** a cross-sectional survey conducted to identify contribution and determinants of use of sorghum biomass as livestock feed.
2. **Post-harvest Efforts**: Development of a forage chopper to be made available locally and evaluation of different conservation practices.
3. **On –Farm Demonstration:** the forage technology packages demonstrated to farmers on-farrn, and preliminary data collected on milk yield of cows

Availability of alternative feed sources for grazing and non-sorghum crop residues reduce the probability that farmers will utilize sorghum biomass as a livestock feed.

Results

- Across the different sorghum growing agroecological zones, 61-87% of the sorghum stover produced by farmers is used as livestock feed (Figure 1).
- Development of chopping machine prototype that has been shared with farmers for I chopping of forage sorghum.
- On-farm feeding trials utilizing green chopped sorghum forage for 27 days resulted in a 1.6 liter of daily milk yield (Figure 2).

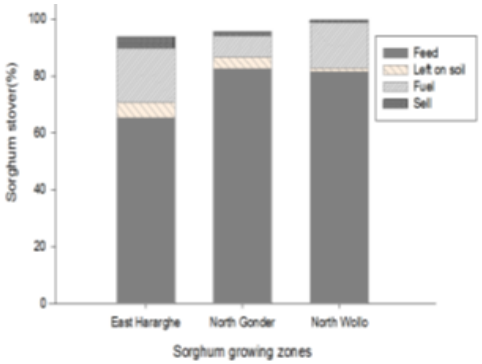


Figure 1. Household survey on sorghum biomass use.

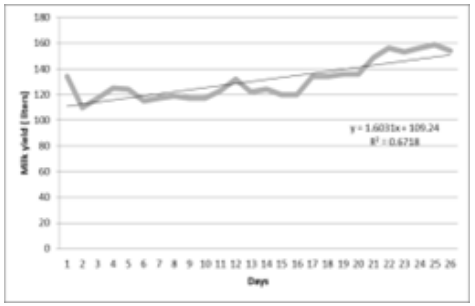


Figure 2. Daily milk yield increment of cows fed on sorghum forage as basal diet.