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Assessing the fodder potentials of drought-tolerant maize (*Zea mays* L.) hybrids in West Africa

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Significance and scaling potential

These hybrids can be recommended for commercial cultivation after multi-location trials to confirm the consistency of their performance. Furthermore, the genetic potential of these hybrids can be exploited in maize breeding programs including the conduct of acceptability trials for the ruminants.

Our innovative approach

Objective: The study evaluated the fodder potential of 42 promising drought-tolerant (DT) three-way cross maize (*Zea mays* L.) hybrids, 11
commercial hybrid checks, and 1 local variety check under irrigation.

Approach: Agronomic and laboratory trials were conducted to determine the morphological traits and fodder potentials of the selected maize cultivars. Hierarchical cluster analysis (HCA) to group cultivars into clusters is based on quantity, quality, and the combination of both variables. Selection of potential food-feed cultivars was based on the quantity traits (grain and biomass yield) and quality traits crude protein (CP), in vitro organic matter digestibility (IVOMD), and metabolizable energy (ME).

- Feed and feeding issues are factors limiting successful ruminant production in sub-Saharan Africa (SSA) as seasonal variation often leads to extreme scarcity and low feeding value of feed resources, especially during the dry season.
- Food-feed crop cultivars that provide good fodder quantity and quality besides grain yield in mixed crop-livestock systems may be the best-fit solution to the challenge posed by the increase in demand for animal-sourced food in the region.
- Maize stover, an important additional by-product and benefits from maize cultivation can play a significant role in contributing to the food basket of ruminant feeding and thereby increasing the production, profitability, and livelihood of the rural poor.

Table 1. List of three-way cross drought-tolerant maize cultivars and a local check used for assessing fodder potential in Nigeria

Entry	Name	Entry	Name	Entry	Name
	DT hybrids	19	M1427-19	38	M1627-6
1	M1124-16	20	M1427-2	39	M1627-7
2	M1124-17	21	M1427-20	40	M1627-8
3	M1124-24	22	M1427-3	41	M1627-9
4	M1124-27	23	M1427-4	42	M1227-5
5	M1124-29	24	M1427-6		***Commercial hybrids***
6	M1124-31	25	M1427-8	43	Oba super I
7	M1227-10	26	M1527-3	44	Oba super II
8	M1227-11	27	M1527-6	45	SAMMAZ 22
9	M1227-12	28	M1527-7	46	SAMMAZ 23
10	M1227-3	29	M1627-1	47	SC637
11	M1304-16	30	M1627-10	48	SC643
12	M1309-67	31	M1627-11	49	SC719
13	M1427-10	32	M1627-12	50	11C82
14	M1427-12	33	M1627-13	51	11C86
15	M1427-13	34	M1627-2	52	13C3
16	M1427-14	35	M1627-3	53	30F32
17	M1427-15	36	M1627-4	54	***Local check***
18	M1427-18	37	M1627-5		

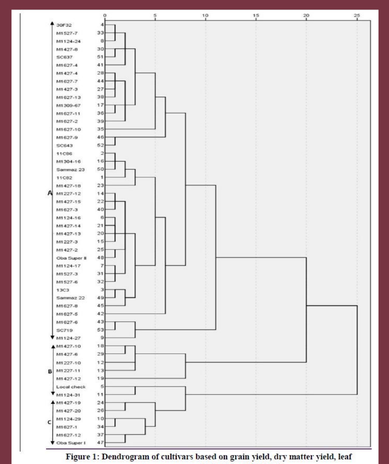

Figure 1: Dendrogram of cultivars based on grain yield, dry matter yield, leaf senescence score, CP, ME and IVOMD

Outcomes

- The Variation was found for dry matter yield (DMY) as commercial hybrid recording the maximum DMY of 14.1 t ha−1 and the highest grain yield of 1.4 t ha−1 ($P < 0.01$), while local check produced a minimum grain yield of 0.54 t ha−1 ($P < 0.01$) with grain moisture content range between 8.4 and 11.6%. The maximum mean ash content was 5.8% for DT hybrids. Average CP was highest in commercial hybrids with a value of 6.1%. The mean values for ME were similar ($P > 0.01$) in both commercial hybrids (7.2 MJ/kg DM) and DT hybrid (7.2 MJ/kg DM), while the highest ME (7.6 MJ/kg DM) was recorded for the local check. Based on this, cultivars in cluster subgroup A3 (M1124–24, M1527-7, 30F32, and M1427-6) and A4 (M1427-3, SC637, and M1627- 11) exhibited high potential for quality and quantity fodder traits.

Next steps

Evaluation of the fodder potential of other arable crops including Rice and Cowpea.

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