University of California ANR Grain and Forage Sorghum Variety Trials

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Introduction

Sorghum (*Sorghum bicolor* [L.] Moench) is the world's fifth most important cereal crop, following rice, maize, wheat, and barley. It plays a key role in animal feed, supporting the dairy and beef industries, pork and poultry production, as well as being used in pet food and bird seed. Additionally, sorghum is a promising candidate for renewable fuels and specialty chemicals. It has also gained popularity in food systems, including gluten-free beer and pastries. With its natural resilience to drought, high temperatures, and poor soil conditions, sorghum is well-suited to adapt to climate change, making it one of the most adaptable forage crops. Ongoing research at the University of California is being conducted at UC Davis, UC Kearney Agricultural Research and Extension Center (KARE), and UC West Side Research and Extension Center (WSREC).

Figure 1. Sorghum Variety Trials Parlier, CA

Results: Forage and Grain Sorghum performance trials in 2023.

Table 1.

Hybrid Information		Agronomic Measurements *				
Company	**Hybrid**	**DTF[1]**	**Plants per ac**	**Height at harvest (cm)**	**Yield (bu/ ac^{-1}) KARE**	**Yield (bu/ ac^{-1}) WSREC**
S&W Seed	SWFS4901	61 e	64097 ab	104.29 cd	100.12 cd	184.29 cd
S&W Seed	SPSD353	72 bc	60250 bc	117.44 a-c	159.84 a	201.45 c
S&W Seed	SP 66M16	66 c-e	60830 bc	118.26 a-c	114.41 a-d	193.31 c
S&W Seed	SWGS4902	68 cd	52555 d	97.95 d	87.64 cd	235.11 b
S&W Seed	SP7715	82 a	64605 ab	130.52 a	109.39 a-d	303.75 a
Scott Seed Co	X50415	80 a	61484 a-c	123.74 ab	153.34 ab	228.73 b
Scott Seed Co	X50615	78 ab	51902 d	131.42 a	123.11 a-c	224.06 b
DYNAGRO	M59GB94	66 c-e	65694 ab	121.7 ab	64.88 d	199.42 c
DYNAGRO	M60GB31	63 de	65404 ab	115.4 a-c	102.59 b-d	185.49 cd
DYNAGRO	M63GB78	69 cd	56402 cd	110.87 b-d	97.31 cd	197.9 c
DYNAGRO	M67GB87	69 cd	60395 bc	122.41 ab	107.6 b-d	160.87 e
DYNAGRO	M71GR91	69 cd	67944 a	118.69 a-c	125.12 a-c	163.26 de
DYNAGRO	M72GB71	67 c-e	61484 a-c	116.88 a-c	128 a-c	198.91 c
Mean		**69.38**	**61323**	**116.76**	**111.32**	**205.16**
CV (coefficients of variation-%)		**7.74**	**9.42**	**12.27**	**27.45**	**6.52**

Various agronomic and yield characteristics for grain sorghum hybrids (averages for each UC California site (KARE and WSREC) for 2023.

Table 2.

Hybrid	Company	Maturity	BMR	Height	% Lodging	Yield (T/A) 65% Moist	% CP	240 hr NDFd	Milk Lbs ton-1	Rel. Feed Quality
X54243	Scott Seed Co	L	NO	288.24 a-c	1.11 ij	42.00 b	6.81 j-l	65.4 b-g	2770.11 j-m	92.5 m-o
TX08005	Bill Rooney	PS	NO	308.18 a	6.67 h-j	40.89 b	5.53 m	66.39 b-e	2639.11 l-n	88.64 no
F17300	Bill Rooney	PS	NO	284.87 a-d	0.00 j	40.65 bc	6.39 k-m	66.64 a-e	2610.33 mn	92.65 m-o
NK300	S&W Seed Co	ME	NO	183.21 kl	0.00 j	29.75 e-j	7.33 d-j	62.31 i	3184.78 b-f	142.01 b-g
F72FS05	DYNAGRO	M	NO	215.79 h-l	0.00 j	29.42 e-j	7.6 b-j	65.52 b-g	3211.78 b-f	138.99 c-h
X52053	Scott Seed Co	M	NO	235.15 e-j	0.00 j	27.76 e-j	7.85 a-g	65.99 b-f	3191.44 b-f	138.91 c-h
F74FS72 BMR	DYNAGRO	M	YES	181.6 kl	0.00 j	27.73 e-j	8.11 a-e	65.83 b-g	3328.11 a-c	159.98 a-c
X50665	Scott Seed Co	M	YES	176.21 l	1.11 ij	27.24 f-k	8.4 ab	62.92 g-i	3314.22 a-d	156.92 a-d
F72FS25 BMR	DYNAGRO	M	YES	205.1 i-l	0.00 j	26.36 f-k	7.44 c-j	68.17 a-c	3091.89 c-i	144.62 a-f
SP2707 DT	S&W Seed Co	ME	NO	191.99 j-l	0.00 j	23.60 jk	8.23 a-c	63.16 f-i	3502.56 a	164.13 a

Top ten highest yielding varieties from 2023 UC Sorghum Forage Trials, using three-location averaged yield with less than 10% lodging when averaged across all three sites[1] (Davis, KARE and WSREC). Lodging percentages and some selected forage quality analyses are also presented for these high yielding varieties. Hybrid information provided by seed companies. Under Maturity, ME=Medium Early, M=Medium L=Late, PS=Photoperiod Sensitive.

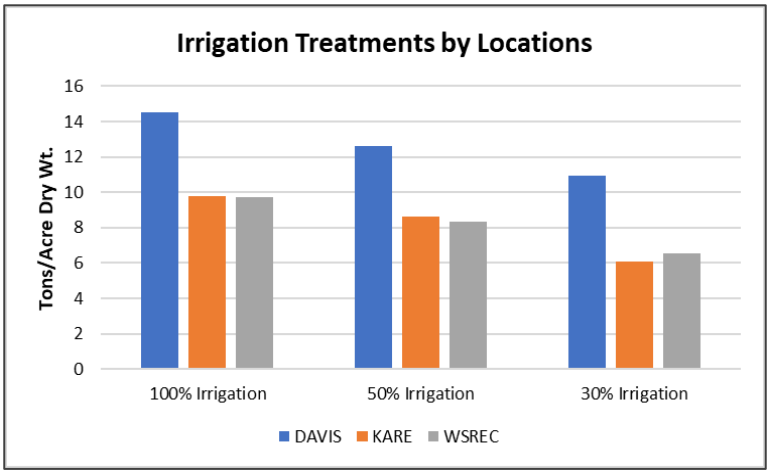

Figure 2: Twelve sorghum forage commercial hybrids were selected for a deficit trial (30%, 50% and 100% of ETc) and planted in three locations with varying soil types and temperature. Combined yields at Davis were higher compared to KARE and Westside.

Our 2023 result also showed that at low irrigation levels 30%, the yields of some hybrids were significantly affected compared to 50% or 100%.

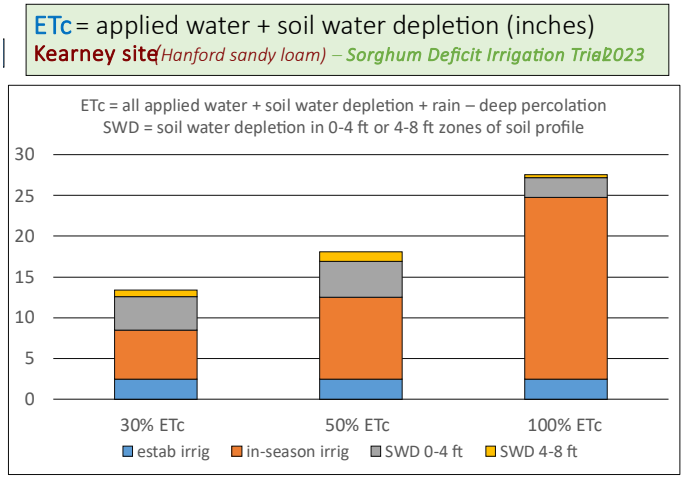

Figure 3: Average crop water usage at KARE across two selected forage sorghum cultivars in three irrigation treatments (30%, 50%, 100% ETc replacement). Establishment irrigation for germination/emergence were uniform across treatment. The sum of irrigation plus Soil Water Depletion (SWD) represents estimated total ETc for the year. Higher SWD occurred in the two deficit treatments (30% and 50%) compared to the control (100%).