Pattern of Above-Ground Biomass Accumulation in Maize Cultivars Grown for Silage

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Key words : length of growing cycle , leaf yield , grain yield

Introduction Maize is the preferred plant species for silage-making in the Highlands of Mexico , the variable amount and distribution of rainfall of the region makes farmers choose between short and long growing cycles maize cultivars . The first ones are safer to achieve the stage for silage-cut but usually at lower total yield than long cultivars ; however , the quality of maize silage depends on the proportion of leaves and grain within the total yield . The objective of this study was to determine leaf and grain yields in maize cultivars of short to long growing cycles .

Materials and methods The experiment was conducted at the University of Chapingo Experimental Station , 19°19′N , 95°31′ W and 2 ,255 masl . Treatments were 12 maize cultivars ; experimental design was a completely randomized block with four replications ; and the experimental unit was a 352 m^2 plot , with 44 rows 80 cm apart . Seeding density was 100 ,000 seed/ha ; NPK fertilization was at the rate of 141-51-51 ; N was split in three applications ; and sprinkle and flood irrigation were used to prevent crop water stress . Three whole plants were harvested at 84 , 101 , 111 , 119 , 130 , 139 and 151 day after seeding , and leaf and grain dry weights were determined . Statistical analyses were for each day of sampling .

Results and Discussion During the whole season the trend was higher leaf yield per plant as maize cultivars went from short (SGC) to long (LGC) growing cycle , at 151 days after seeding LGC cultivars produced up to two times more leaf yield per pant than SGC . Grain yield per plant was usually not different ($P>0.05$) among maize cultivars (Table 1) , indicating that the difference found in total yield among maize cultivars of different growing cycle comes from leaf yield and not from grain .

Table 1 *Leaf and grain weights in different maize cultivars at different plant age .*

Plant age (days)	Growing cycle										
	Short			Intermediate		Intermediate/long		Long			
	CIMMYT 11	CIMMYT 83	HVJ 2	HVC1	HVC2	VCH 3	VS 22	HVR1	HVR2	V18	V107
	Leaf (g/plant)										
84	36 .1d‡	36 .7d	39 .9dc	53 .1bdac	49 .0bdac	51 .5bdac	44 .2bdc	45 .1bdc	66 .4a	60 .1bac	62 .2a
101	44 .5b	46 .2b	53 .4ba	59 .2ba	66 .6ba	55 .0ba	62 .7ba	63 .0ba	72 .9a	70 .9a	75 .7a
111	52 .0a	44 .2a	53 .2a	61 .0a	48 .4a	43 .5a	57 .2a	56 .0a	71 .0a	63 .1a	52 .0a
119	39 .0b	42 .2ba	44 .5ba	54 .2ba	50 .9ba	50 .9ba	53 .1ba	56 .6ba	62 .1a	56 .7a	60 .6a
130	33 .8b	43 .2ba	50 .9ba	49 .8ba	41 .9ba	54 .1a	56 .6a	58 .0a	58 .6a	53 .1ba	53 .6ba
139	35 .9a	40 .9a	48 .1a	52 .5a	49 .9a	47 .9a	50 .5a	60 .9a	60 .5a	54 .0a	45 .2a
151	34 .2b	52 .2ba	52 .2ba	60 .4ba	43 .0ba	51 .7ba	61 .7ba	72 .0a	72 .4a	69 .6a	72 .6a
	Grain (g/plant)										
111	36 .6a	34 .0a	19 .5a	15 .2ba	20 .2a	9 .2a	12 .6a	23 .0ba	20 .2ba	10 .6ba	0 .0b
119	48 .4a	53 .6a	36 .0a	44 .6a	46 .7a	31 .7a	13 .9a	29 .1a	42 .0a	13 .1a	22 .1a
130	68 .0a	69 .7a	85 .1a	76 .4a	36 .9a	53 .6a	79 .6a	71 .2a	69 .0a	42 .0a	38 .5a
139	62 .9bac	84 .5bac	94 .4ba	52 .0bc	95 .4a	82 .7bac	59 .0bac	133 .2a	76 .6bac	51 .0bc	22 .6c
151	83 .0a	113 .2a	93 .5a	103 .4a	96 .0a	68 .7a	130 .4a	95 .0a	151 .9a	61 .7a	100 .7a

‡ Means within rows with at least one letter in common are not different ($P>0.05$)

Conclusion Length of the growing cycle in maize cultivars might bring differences in leaf yield per plant with no differences in grain yield per plant .