Seedling Growth and Yield in Common Vetch at Different Seeding Density and Date

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The XXI International Grassland Congress / VIII International Rangeland Congress took place in Hohhot, China from June 29 through July 5, 2008.

Proceedings edited by Organizing Committee of 2008 IGC/IRC Conference

Published by Guangdong People's Publishing House

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Key words : residual soil moisture , winter forage , *Vicia sativa* L .

Introduction Common vetch (*Vicia sativa* L .) is a winter annual legume with potential to grow using residual soil moisture in the deep soils found in the valleys of the center highlands of Mexico . There is little information , however , on common vetch performance when growing in colder and drier environment and the seeding date is delayed . The objective of the study was determine some growth attributes of common vetch as seeding date is delayed and rate increased .

Materials and methods Nine treatments were compared in a 3x3 factorial design : seeding dates were 31 August (early) , 10 September (intermediate) , and 20 September (late) ; rates were 60 , 80 and 100 kg seed ha^{-1} . These treatments were replicated 4 times within the completed randomized experiment which was repeated during 2 growing seasons (2005-06 and 2006-07) . Air temperature , rainfall and soil moisture content were recorded from the first seeding date to harvest . Harvest was conducted at 10 % flowering or when senescent material started to appear at the bottom of the crop which occurred at 114 , 135 and 144 d after seeding for early , intermediate and late seeding dates , respectively . Emergence , above ground biomass , and forage yield data (Table 1) were evaluated using mixed model , analyses of variance where the random effect was growing season .

Results and discussion One growing season was colder and drier and the other showed higher rainfall than the average of the ten previous years . Soil moisture content during the first 80 d after each seeding date was lowest ($P<0.05$) in the late seeding . The interaction of seeding date x rate was not significant ($P>0.05$) in any of the variables analyzed . The poorest and best ($P<0.05$) seedling performance (above-ground biomass) were found with late and early seeding , respectively (Table 1) . Late seeding exposed common vetch to a colder and drier environment . Forage yield in these two seeding dates , however , was similar , while the intermediate date gave the highest ($P<0.05$) yield . Early and late seeding gave similar yield because time interval from seeding to harvest compensated for the lower forage accumulation rate found with late seeding compare to early seeding . Seeding rate up to 80 kg ha^{-1} increased ($P<0.05$) forage yield and daily forage accumulation rate only with no significant ($P>0.05$) effect on seedling performance .

Table 1 *Seedling and yield attributes in common vetch sown at different date and density . Mean of two years .*

Density (kg/ha)	Seeding date			Average
	August 31	Sept . 10	Sept . 20	
	a) Emergency 16 d after seeding (%)			
60	91	90	65	82‡
80	90	91	65	82
100	94	98	64	85
Average	92 a	93 a	65 b	
	b) Above-ground biomass 45 d after seeding (mg/seedling)			
60	725	659	312	565
80	742	571	284	532
100	728	573	273	525
Average	732 a	601 b	289 c	
	c) Forage yield (t DM/ha) and estimated forage accumulation (kg DM/ha/day			
60	1 .9 / 16 .7	2 .2 / 16 .3	1 .9 / 13 .3	2 .0 b / 15 .4 b
80	2 .3 / 20 .2	2 .7 / 19 .9	2 .3 / 16 .3	2 .4 a / 18 .8 a
100	2 .4 / 20 .8	3 .1 / 22 .6	2 .5 / 17 .8	2 .6 a / 20 .4 a
Average	2 .2 b / 19 .2 a	2 .7 a / 19 .6 a	2 .3 b / 15 .8 b	

a , b , c means within row or column with at least one letter in common or with no letters are not different ($P>0.05$)

Conclusions Common vetch can compensate a poor seedling growth in late seeding if given a longer time between sowing and harvest . Seeding density can improve forage yield but not seedling performance .