

Figures 1-22

TOPSOIL TILLAGE	CH	X	X	X	X	X	BLOCK 1
	GR	X	X	X	X	X	
	DR	X X	X X	X X	X X	X X	
	CH	X	X	X	X	X	BLOCK 2
	DR	X X	X X	X X	X X	X X	
	GR	X	X	X	X	X	
	DR	X X	X X	X X	X X	X X	BLOCK 3
	CH	X	X	X	X	X	
	GR	X	X	X	X	X	
		DL	GR	DR	CH	NT	
		SUBSOIL TILLAGE					

LEGEND

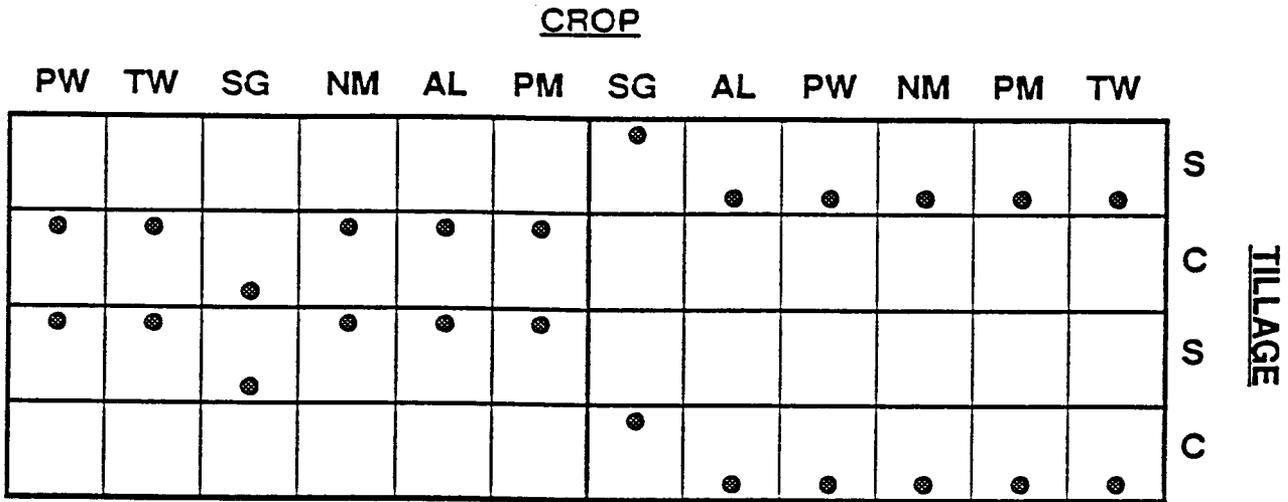
TILLAGE TREATMENTS

CH=CHISEL
 DL=DEEP LIFT
 DR=DEEP RIP
 GR=GRADER RIP
 NT=NO TILL

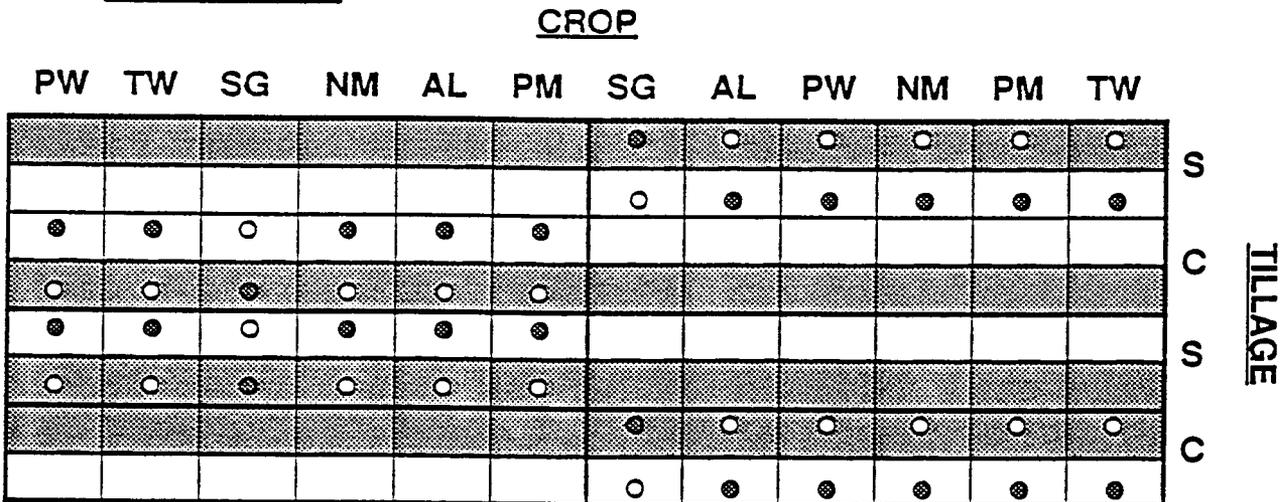
X=ACCESS TUBE LOCATIONS

Figure 1. Plot design for the topsoil/subsoil tillage treatment locations at Center and Coteau.

YEARS 1-3



YEARS 4-6



CROP

AL - alfalfa
 NM - native mix
 PM - precrop mix
 PW - pubescent wheatgrass
 SG - small grain
 TW - tall wheatgrass

TILLAGE

C - chisel
 S - subsoil

- Original Access Tubes
- Additional Access Tubes
- ▨ Small Grain Strips - Years 4-6

Figure 2. Plot designs for the topsoil tillage/forage treatment locations at Glenharold and Knife River.

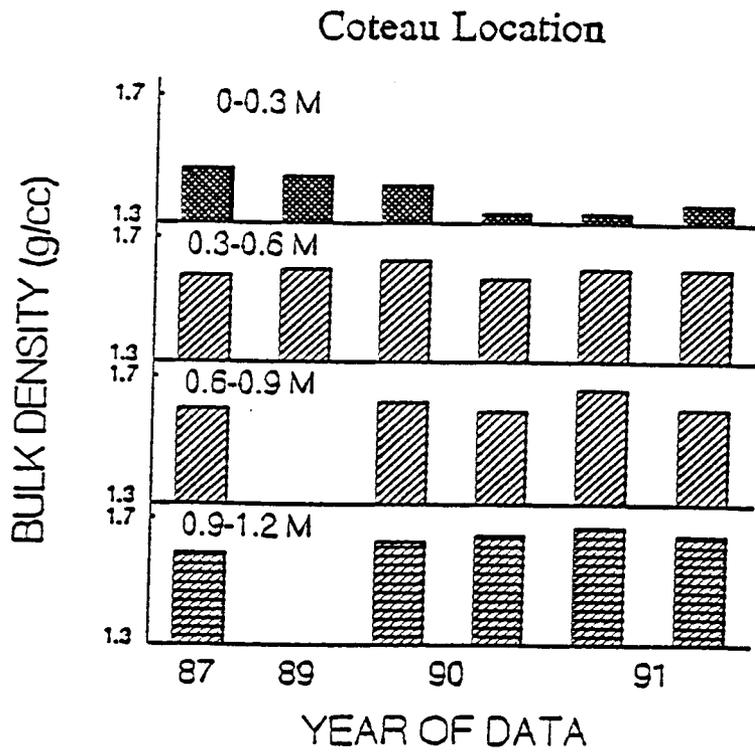
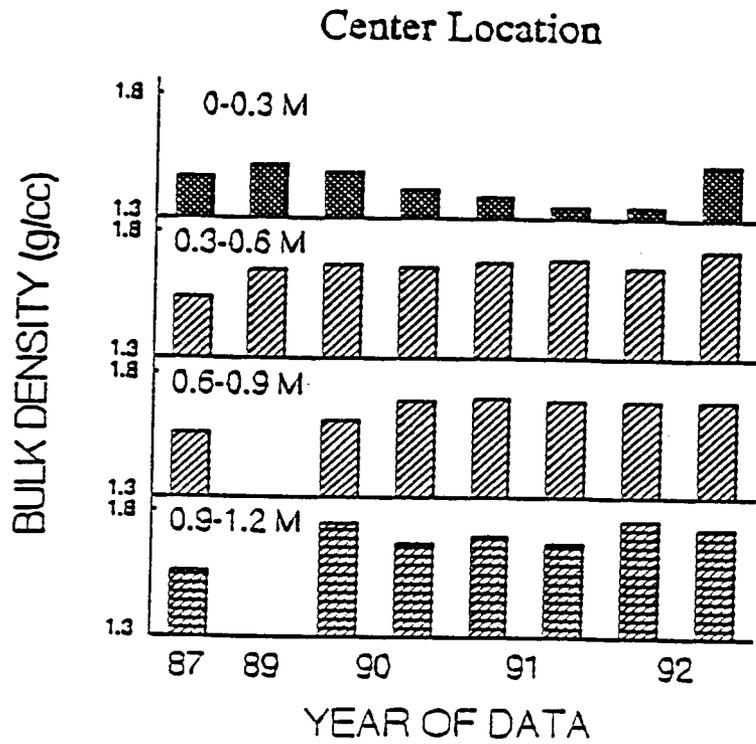


Figure 3. Mean site bulk densities by depth and sampling date at the Center and Coteau tillage locations.

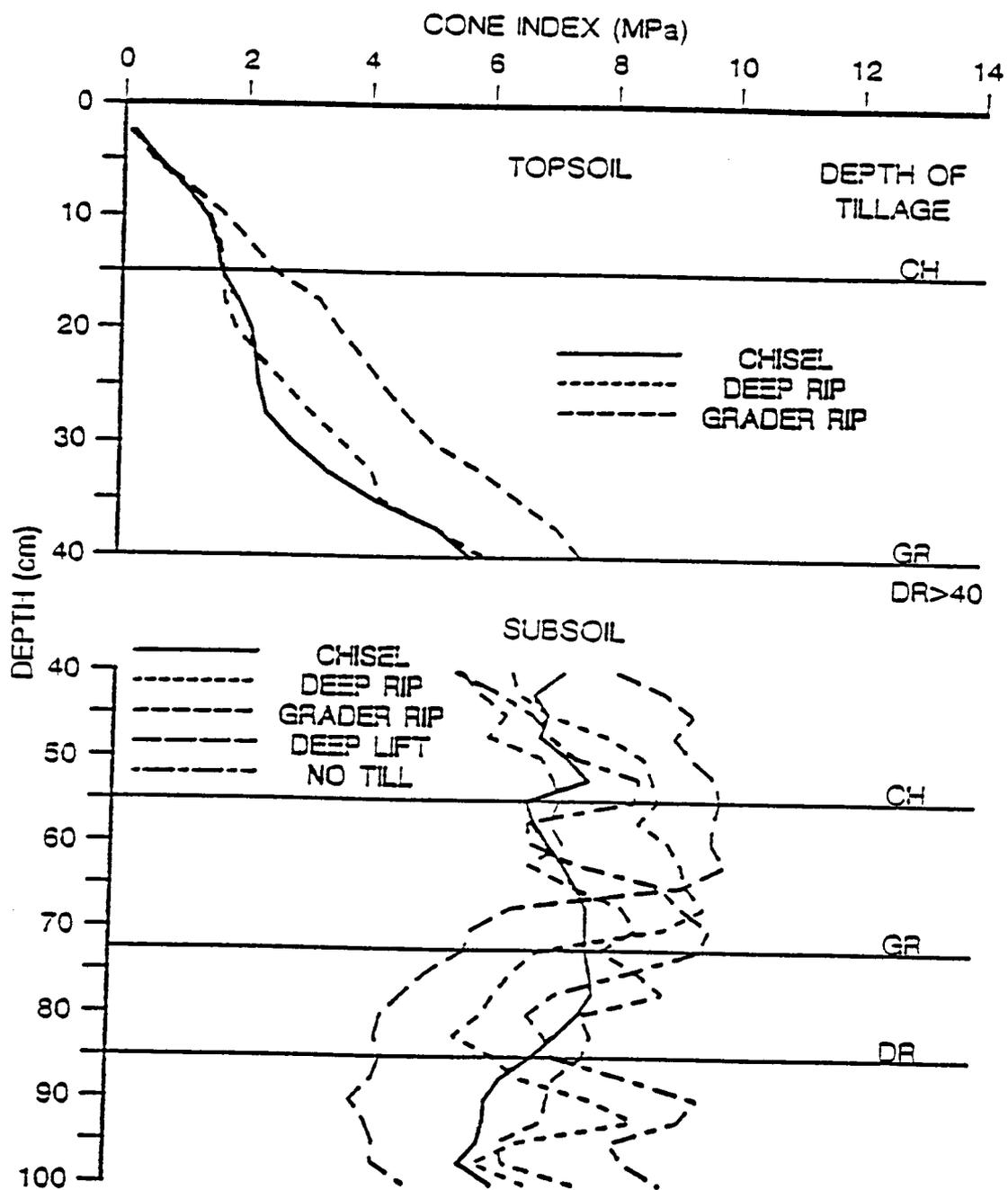


Figure 4. Mean cone index values for 1990 at the Coteau location.

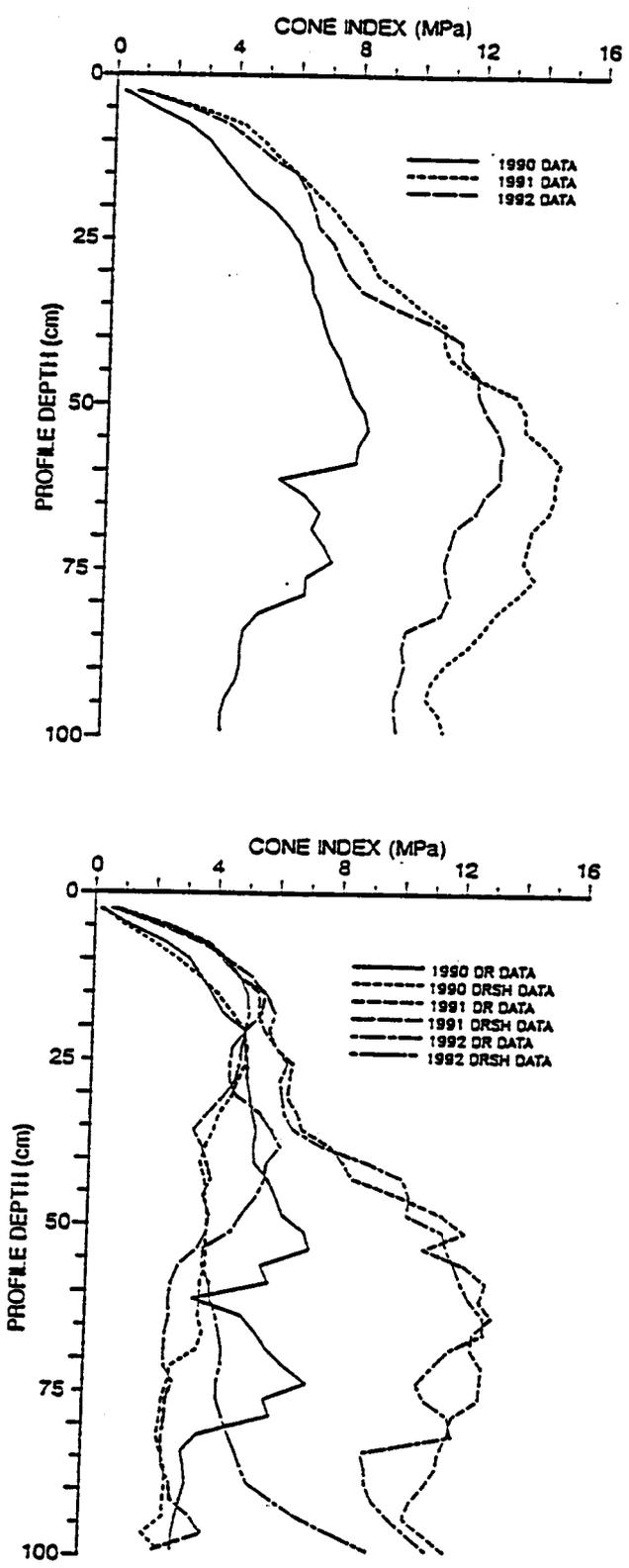


Figure 5. Changes with time for mean cone index values (no topsoil DR data in whole plot means) at the Center location and changes with time within the DR topsoil tillage subplots for between (DR) and within shank tracks (DRSH).

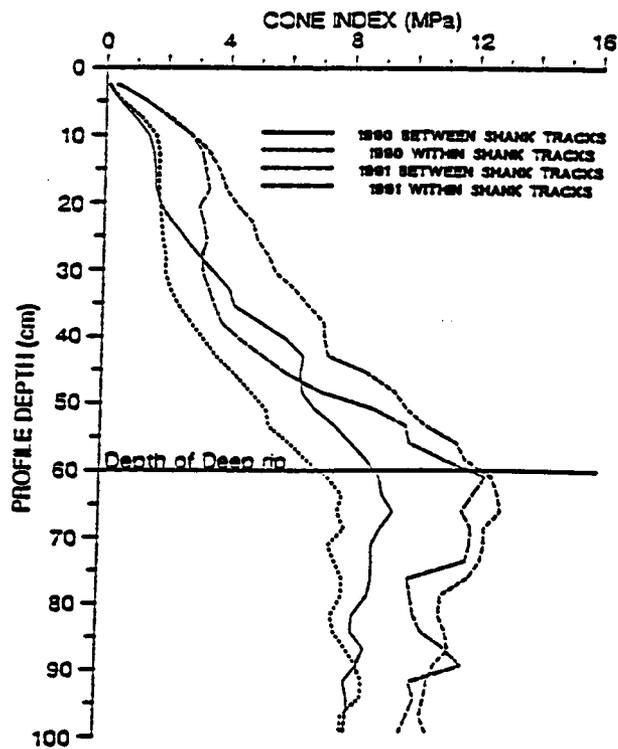
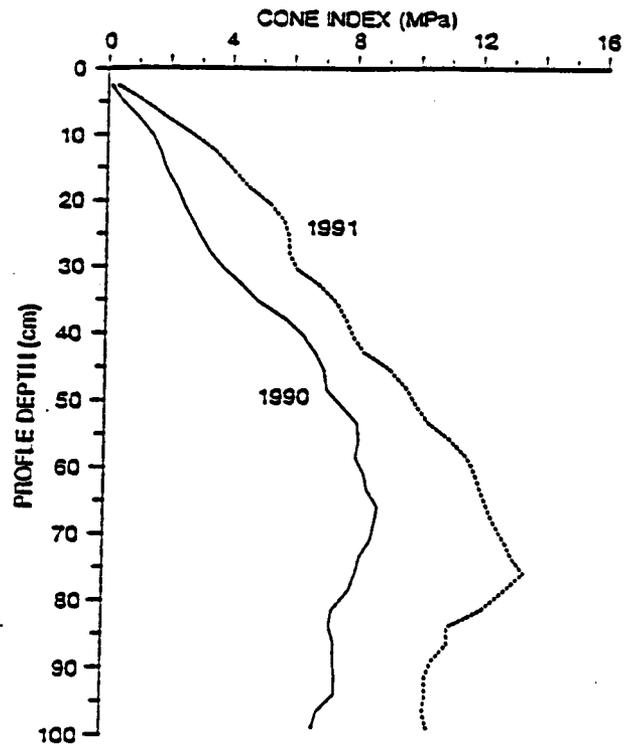


Figure 6. Changes with time for mean cone index values (no topsoil DR data in whole plot means) at the Coteau location and changes with time within the DR topsoil tillage subplots.

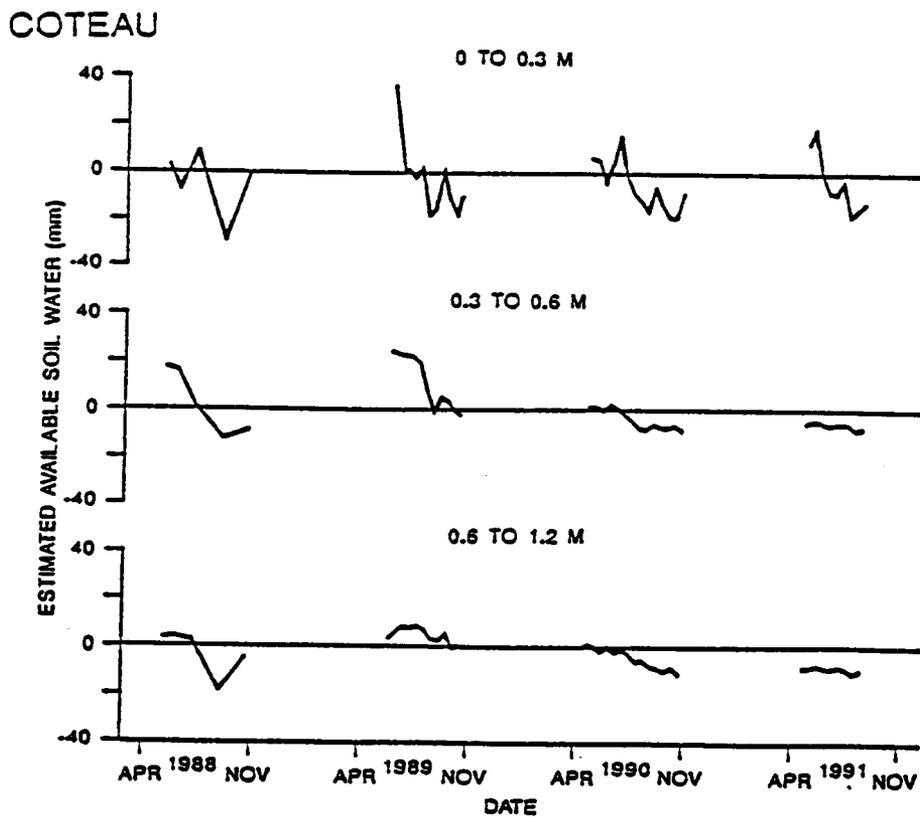
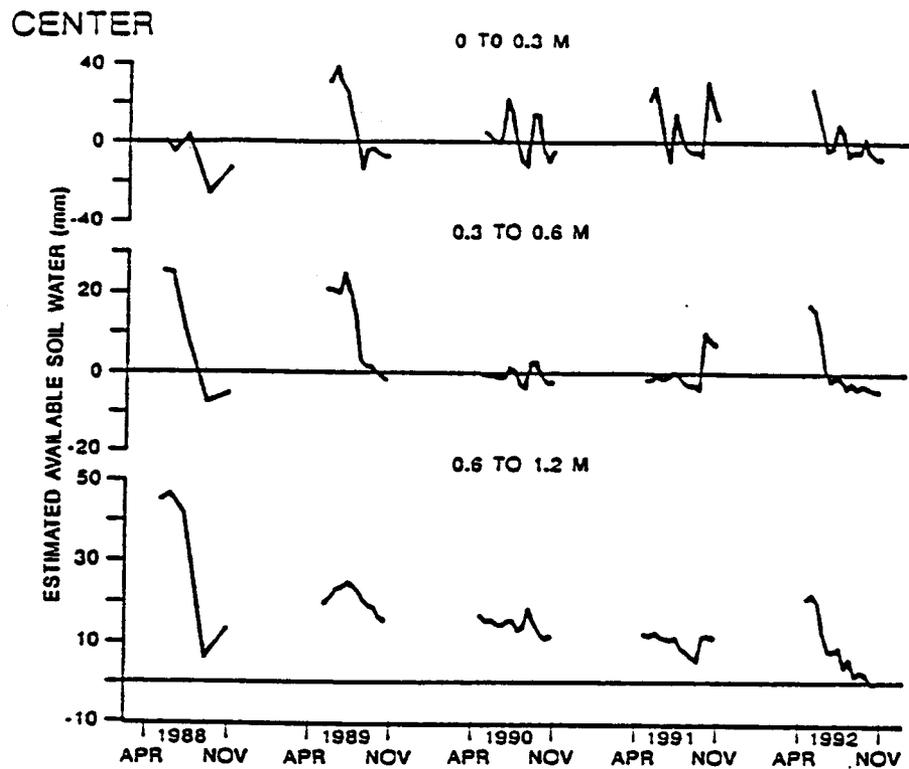


Figure 7. Mean available soil water with time at the topsoil/subsoil tillage locations.

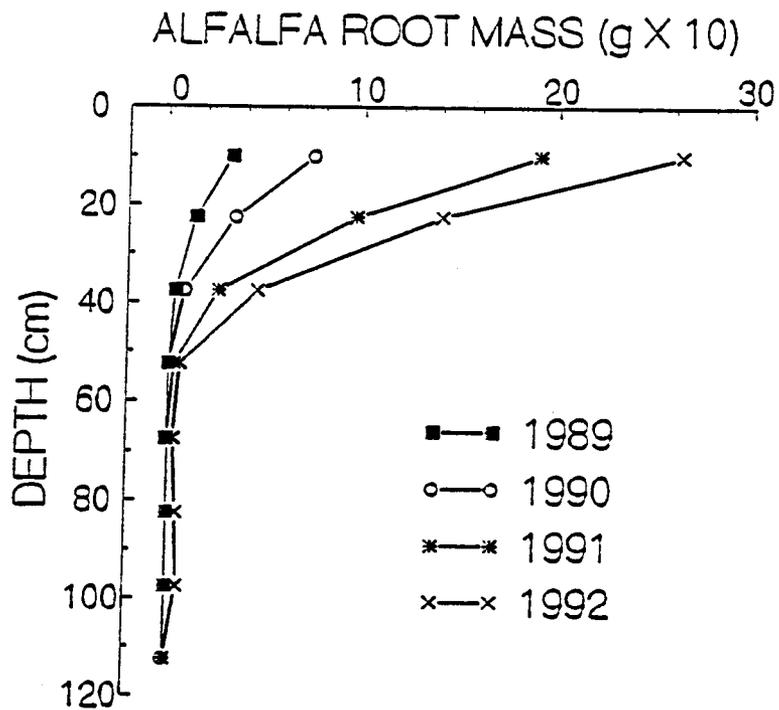
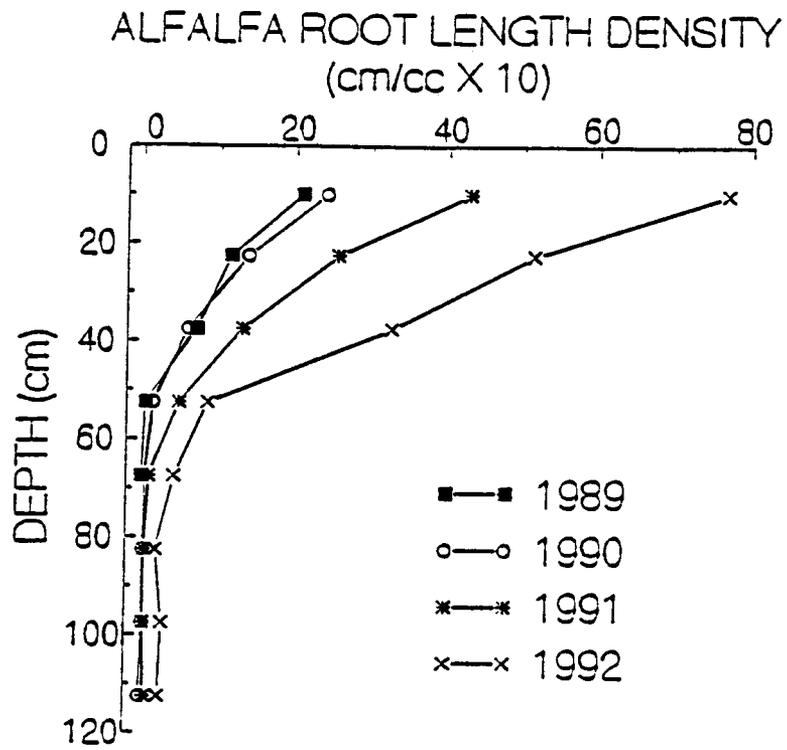


Figure 8. Mean changes by sample mid-depths for root length density and root mass for alfalfa at the Center location.

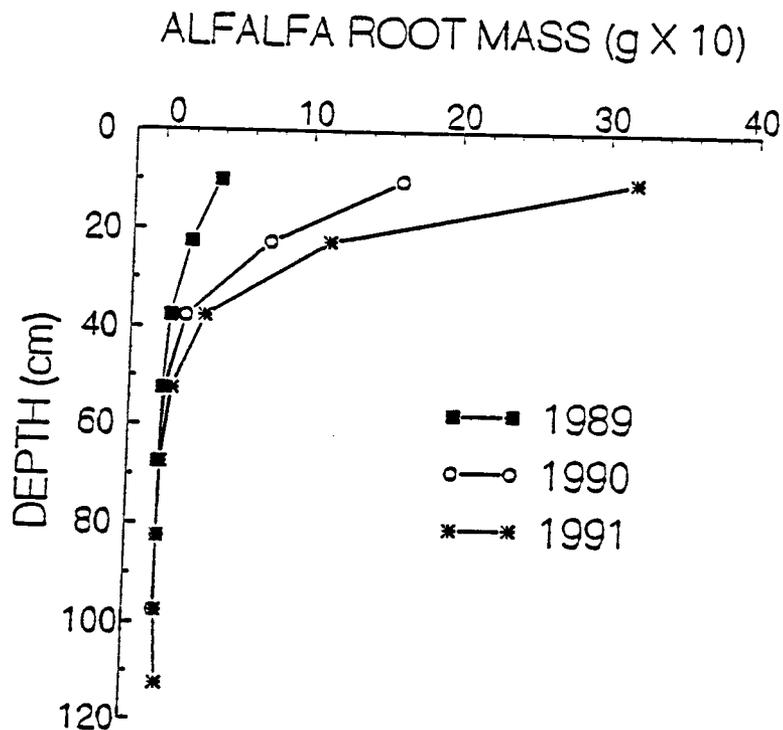
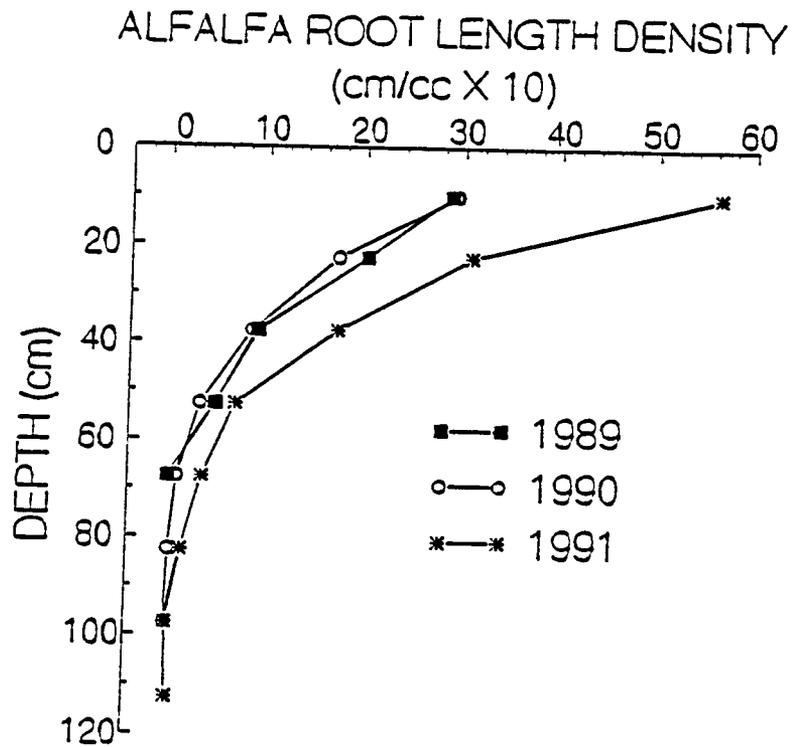


Figure 9. Mean changes by sample mid-depths for root length density and root mass for alfalfa at the Coteau location.

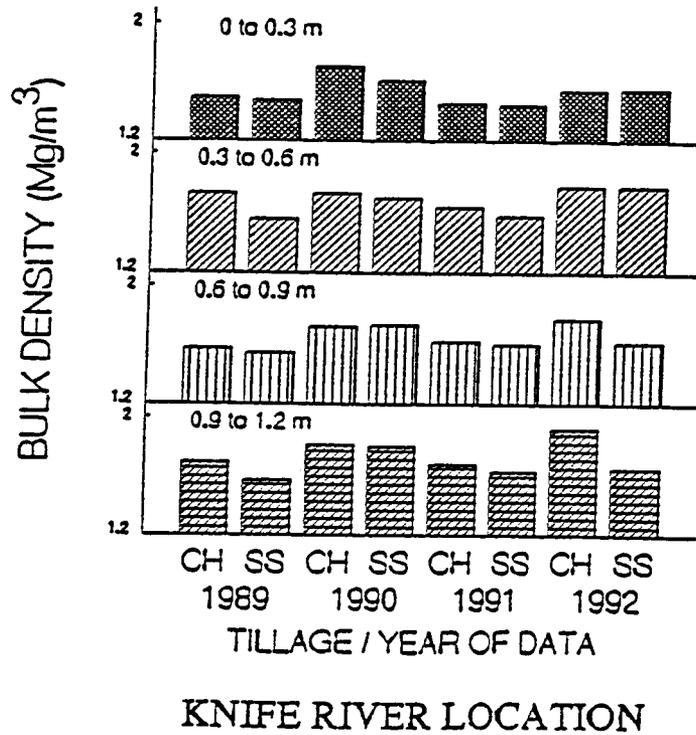
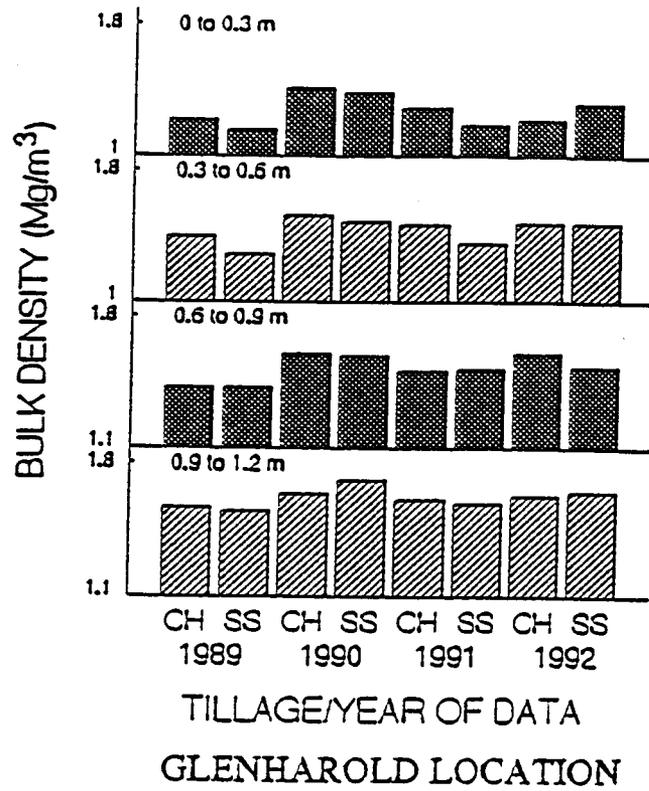


Figure 10. Mean tillage bulk densities averaged over crops at the two locations.

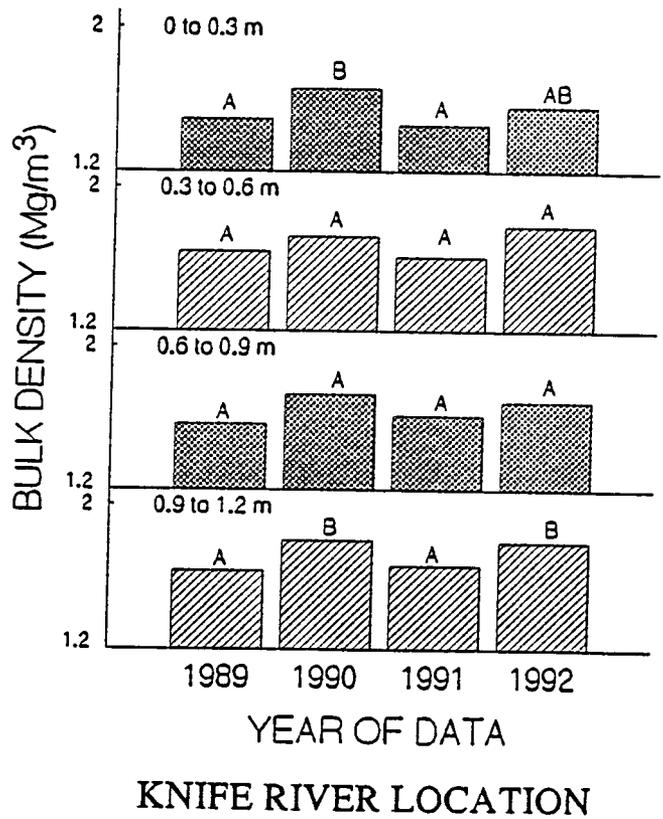
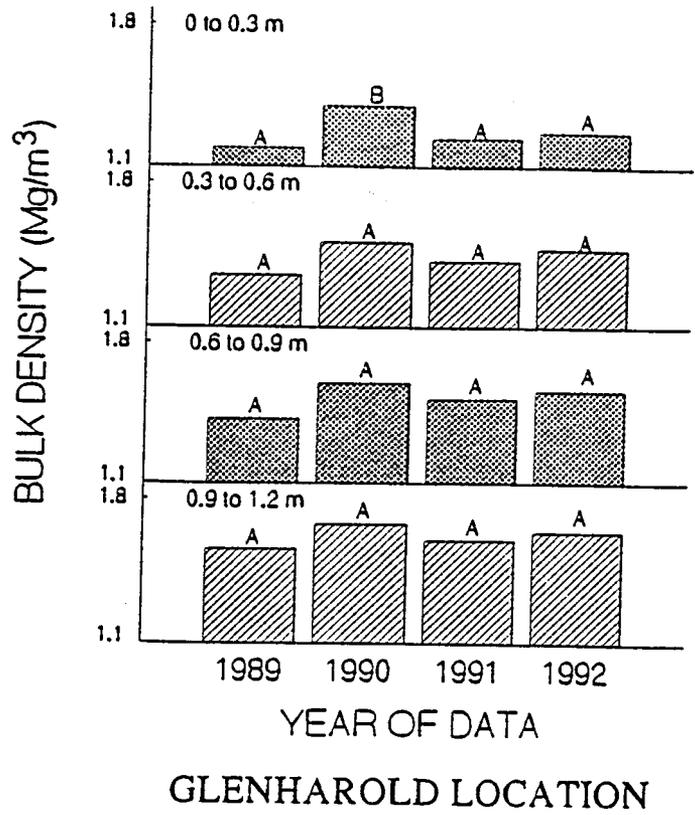


Figure 11. Mean location bulk densities by depth with time (values within depths with the same letter are not significantly different at the P = 0.10 level).

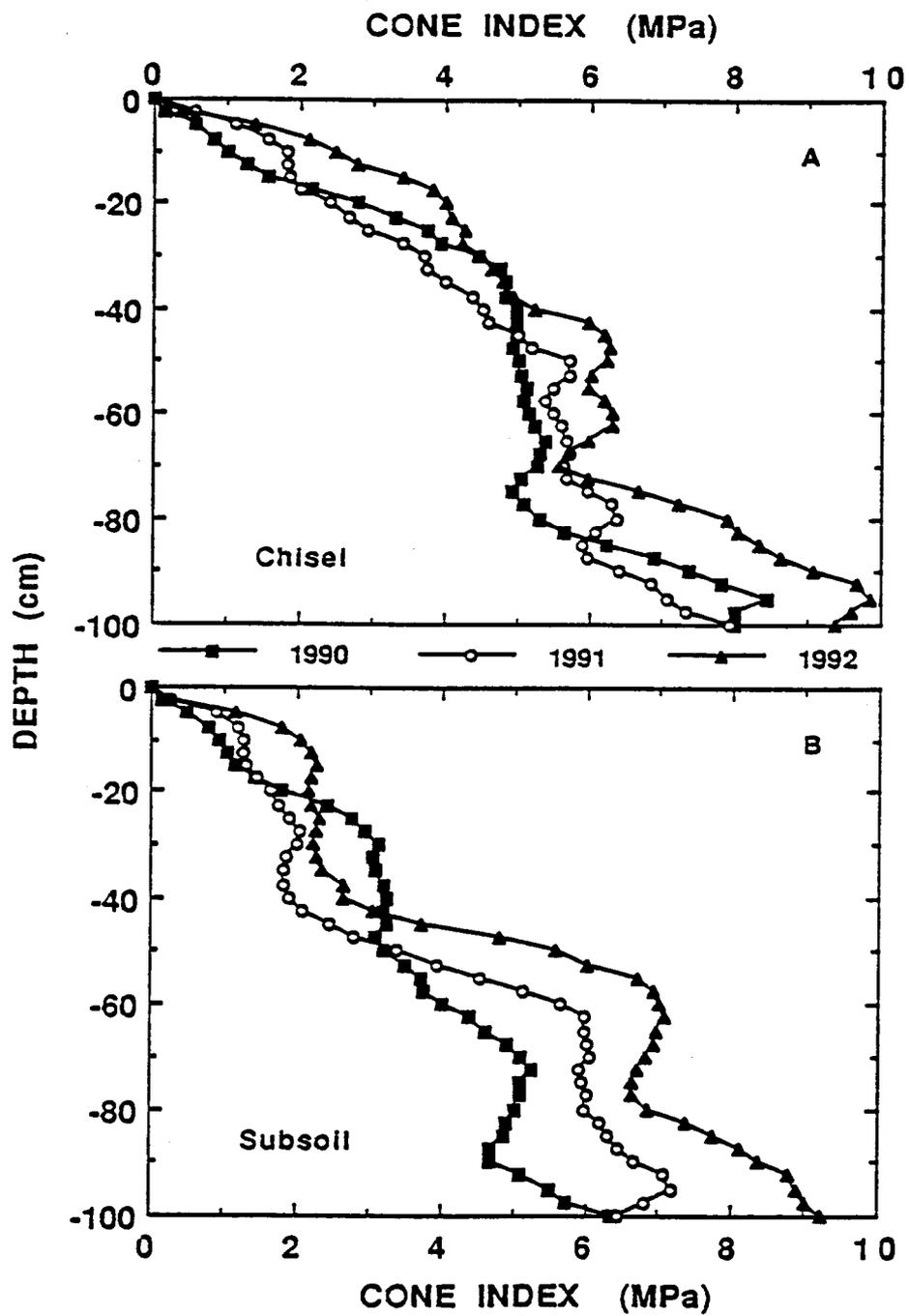


Figure 12. Mean penetrometer cone indices from the (a) chisel and (b) subsoil tillage treatments at the Glenharold tillage location.

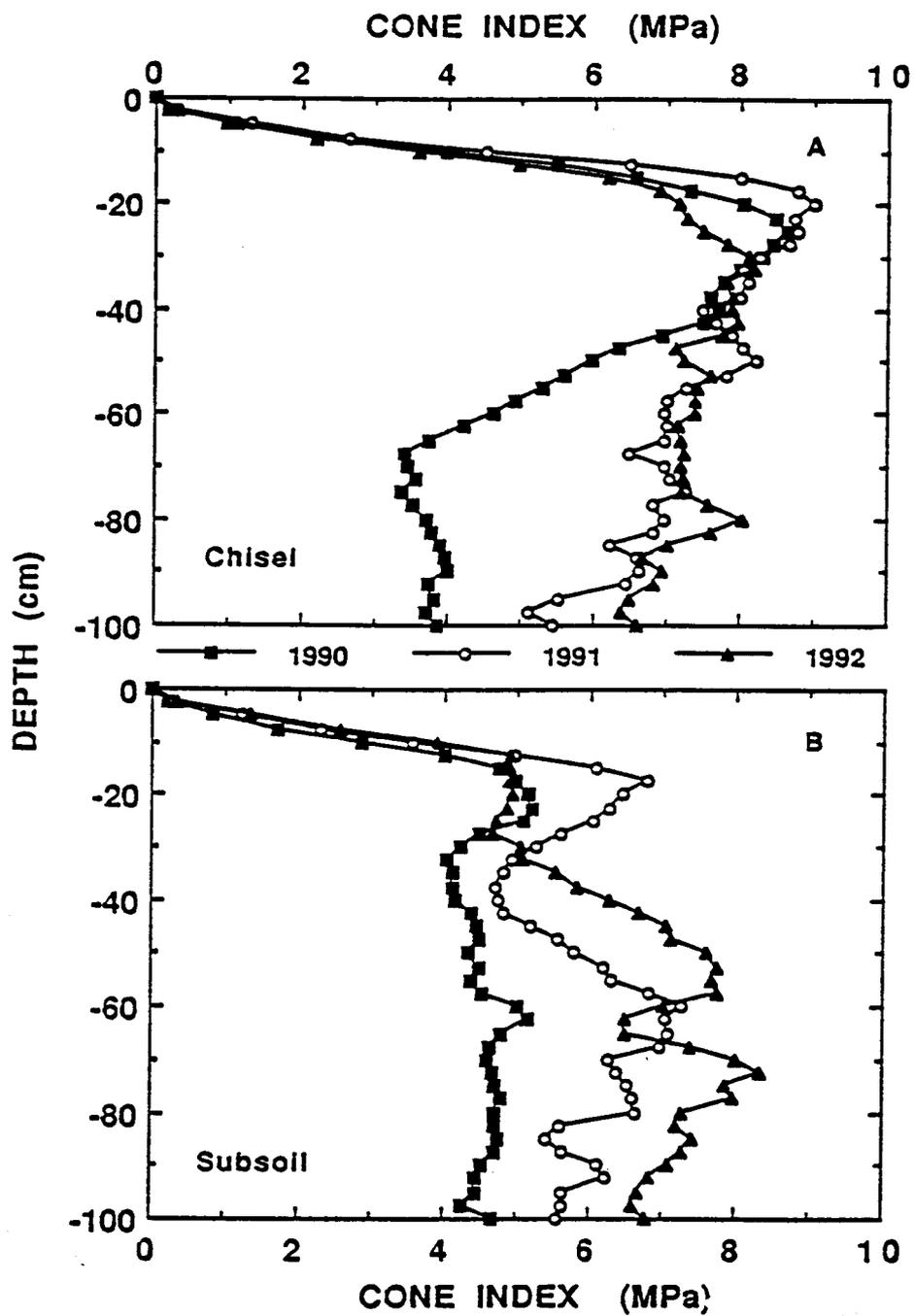


Figure 13. Mean penetrometer cone indices from the (a) chisel and (b) subsoil tillage treatments at the Knife River tillage location.

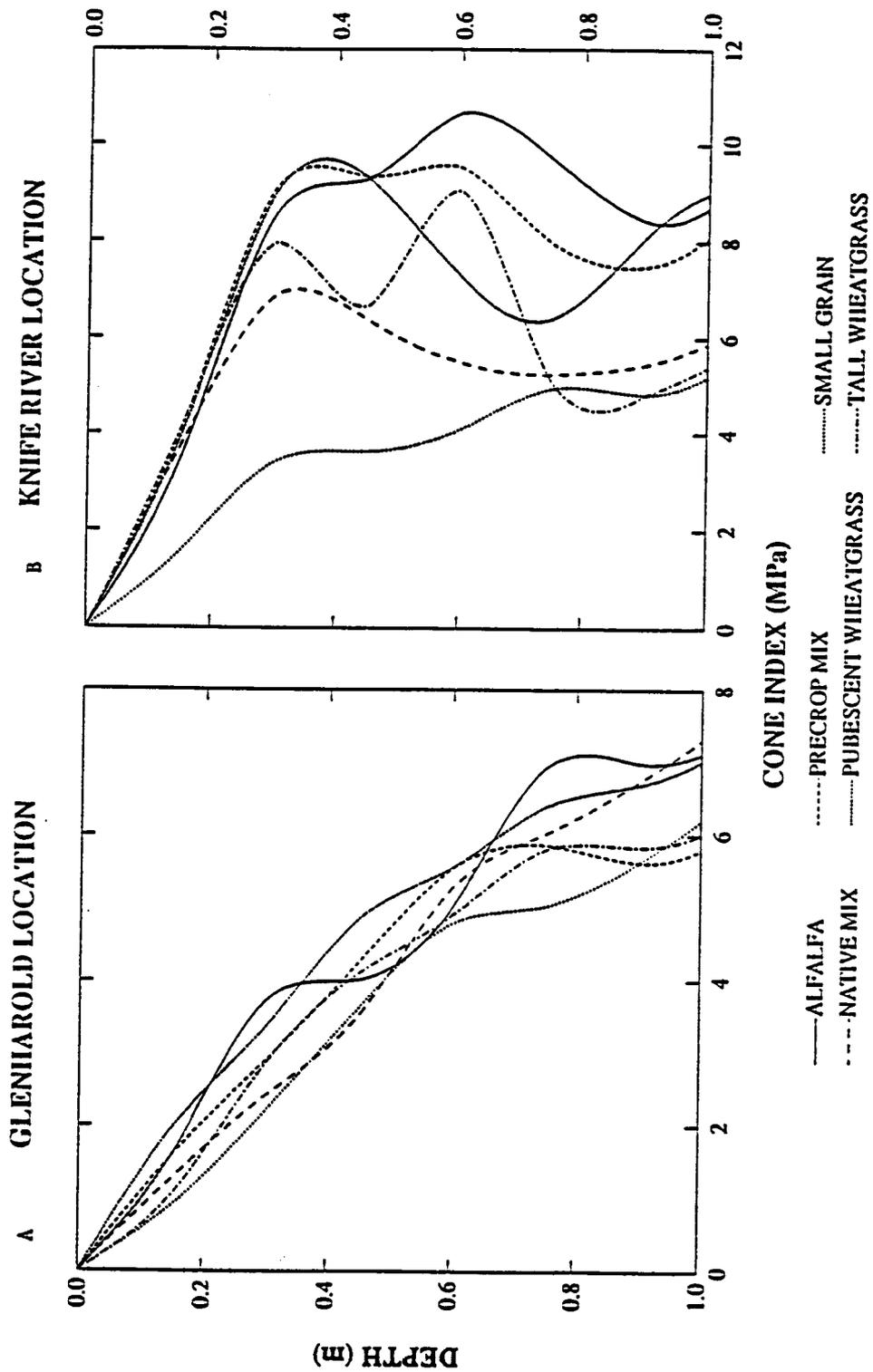


Figure 14. Mean penetrometer cone indices by crop from the (a) Glenharold and (b) Knife River tillage locations.

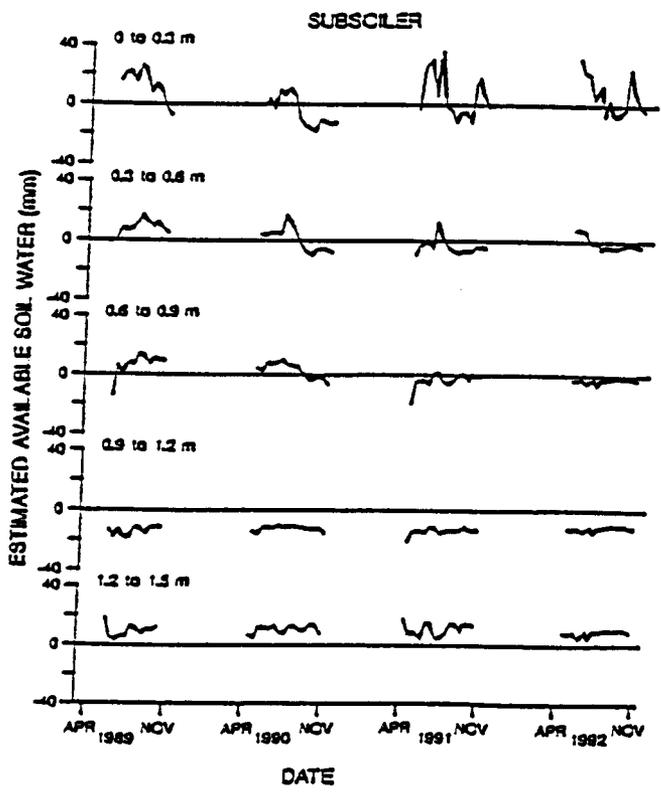
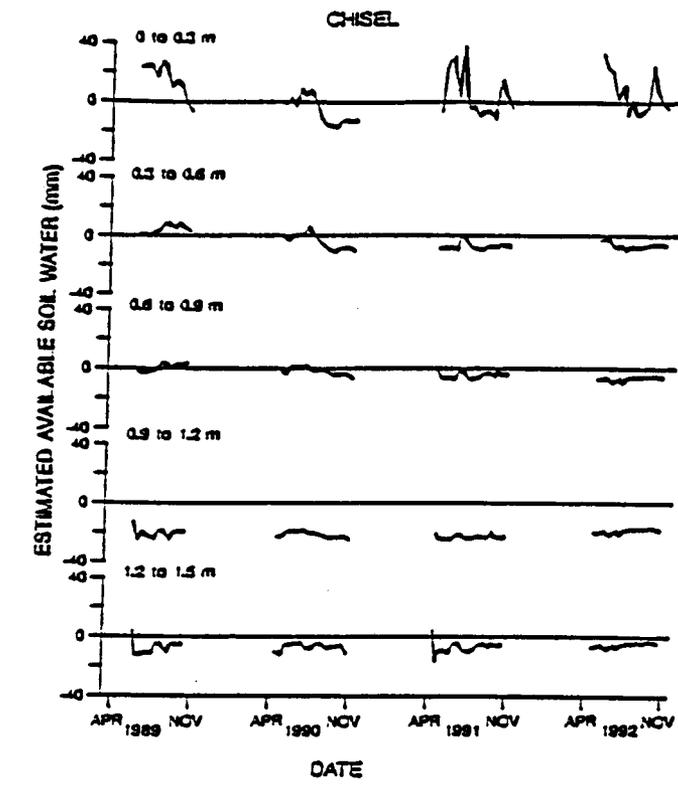


Figure 15. Mean available water from the beginning to the end of the growing seasons for the chisel and subsoil tillage treatments at the Glenharold tillage location.

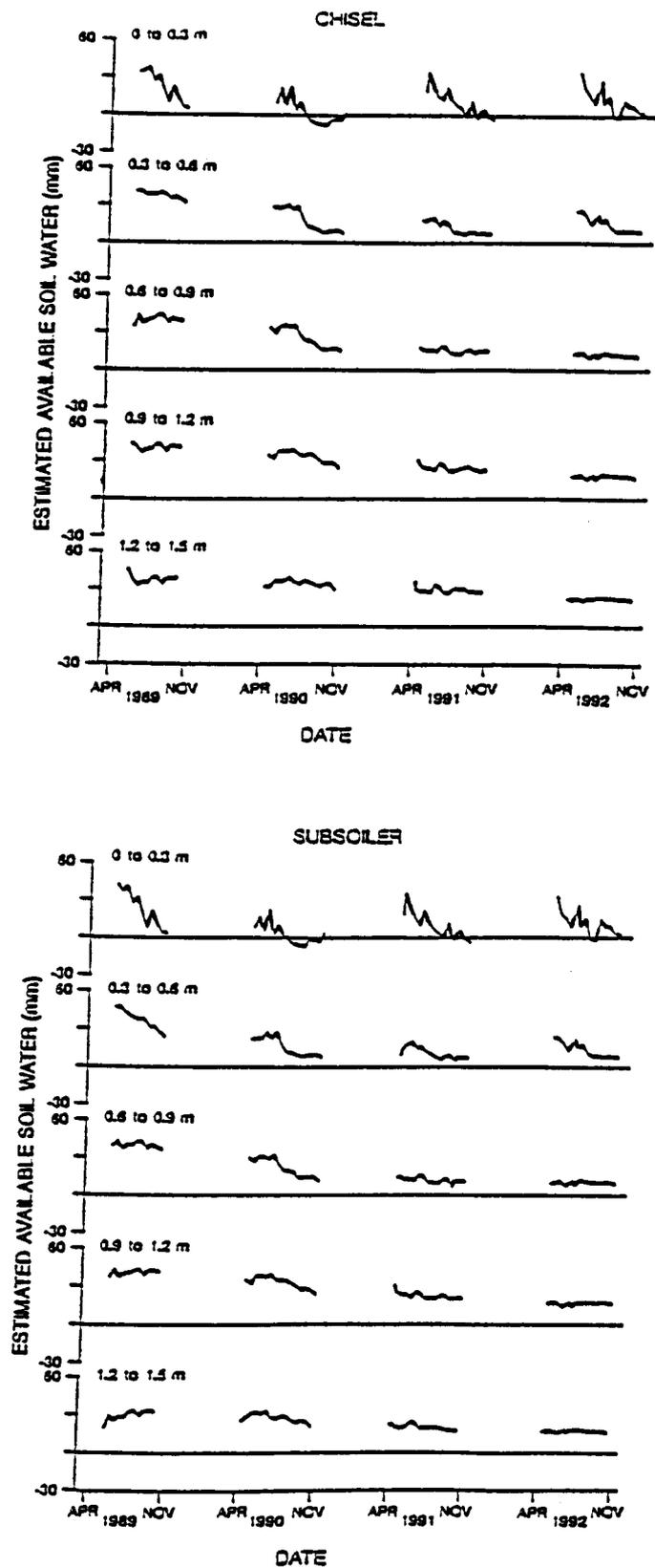
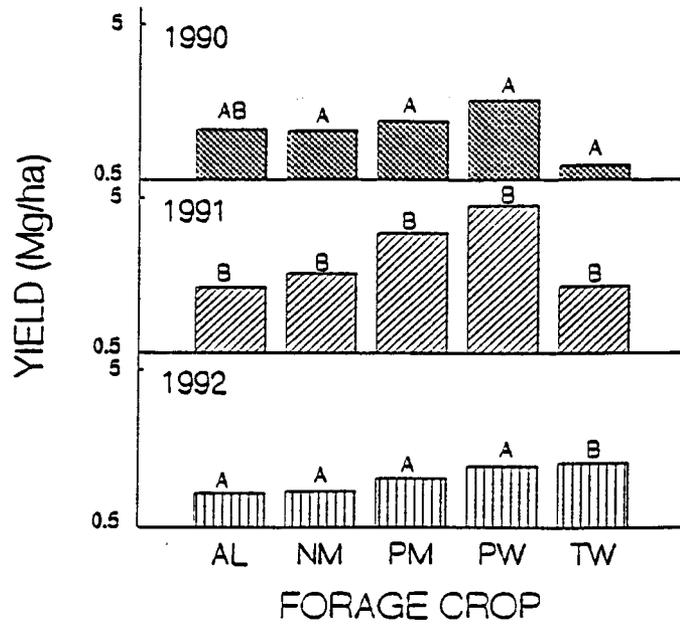
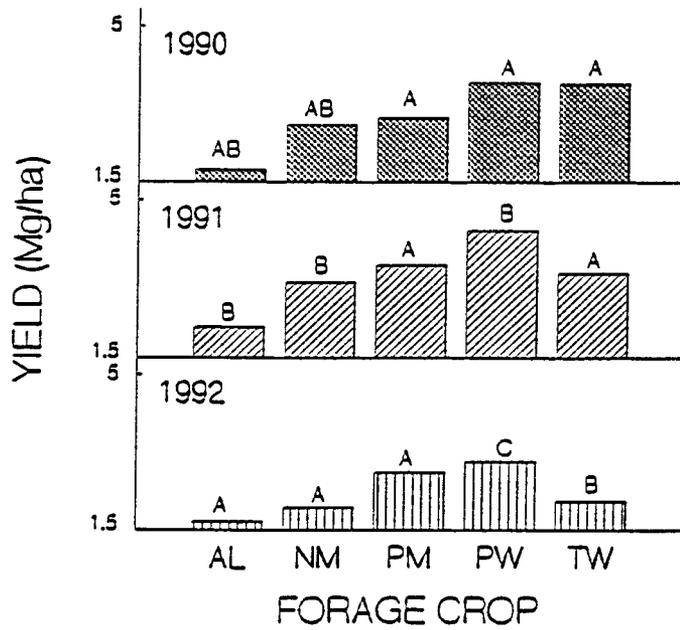


Fig. 16. Mean available water from the beginning to the end of the growing seasons for the chisel and subsoil tillage treatments at the Knife River tillage location.



GLENHAROLD FORAGE YIELDS



KNIFE RIVER FORAGE YIELDS

Fig. 17. Mean yearly forage yields by crop at the tillage locations (values by crops with the same letter are not significantly different at the $P = 0.10$ level).

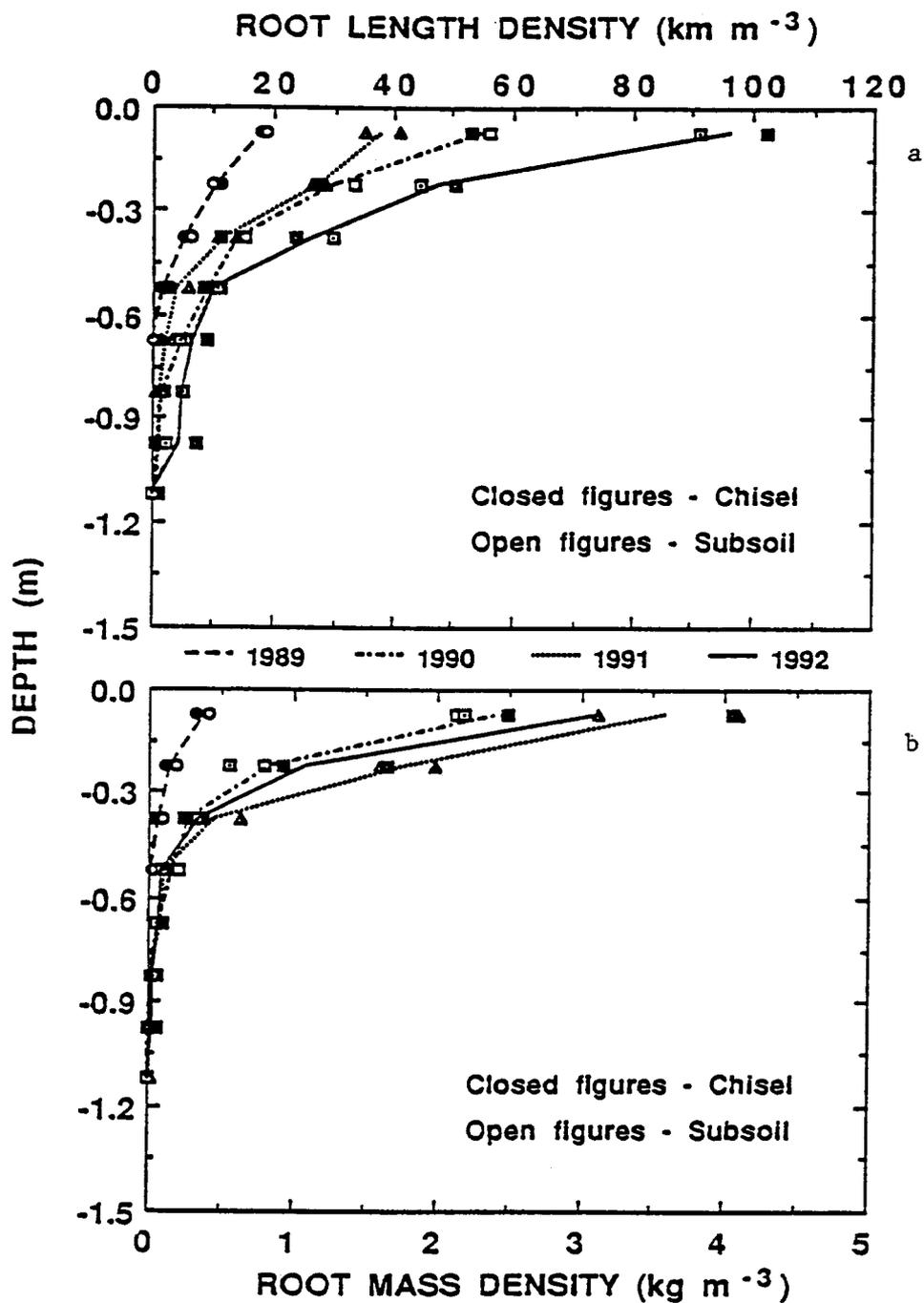


Figure 18. Mean root (a) length and (b) mass densities from the Glenharold tillage location.

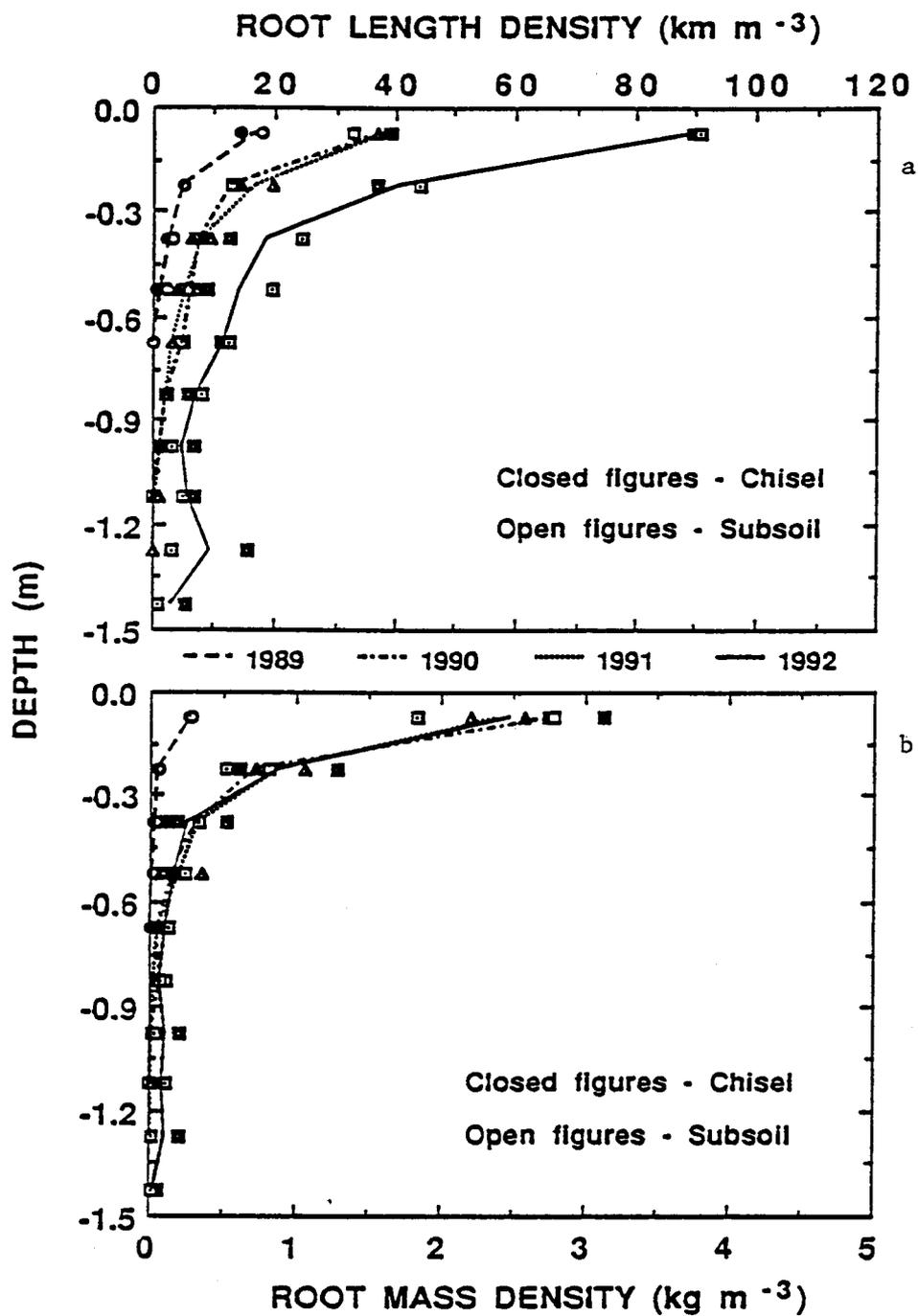


Figure 19. Mean root (a) length and (b) mass densities from the Knife River tillage location.

FALKIRK TRENCH DATA

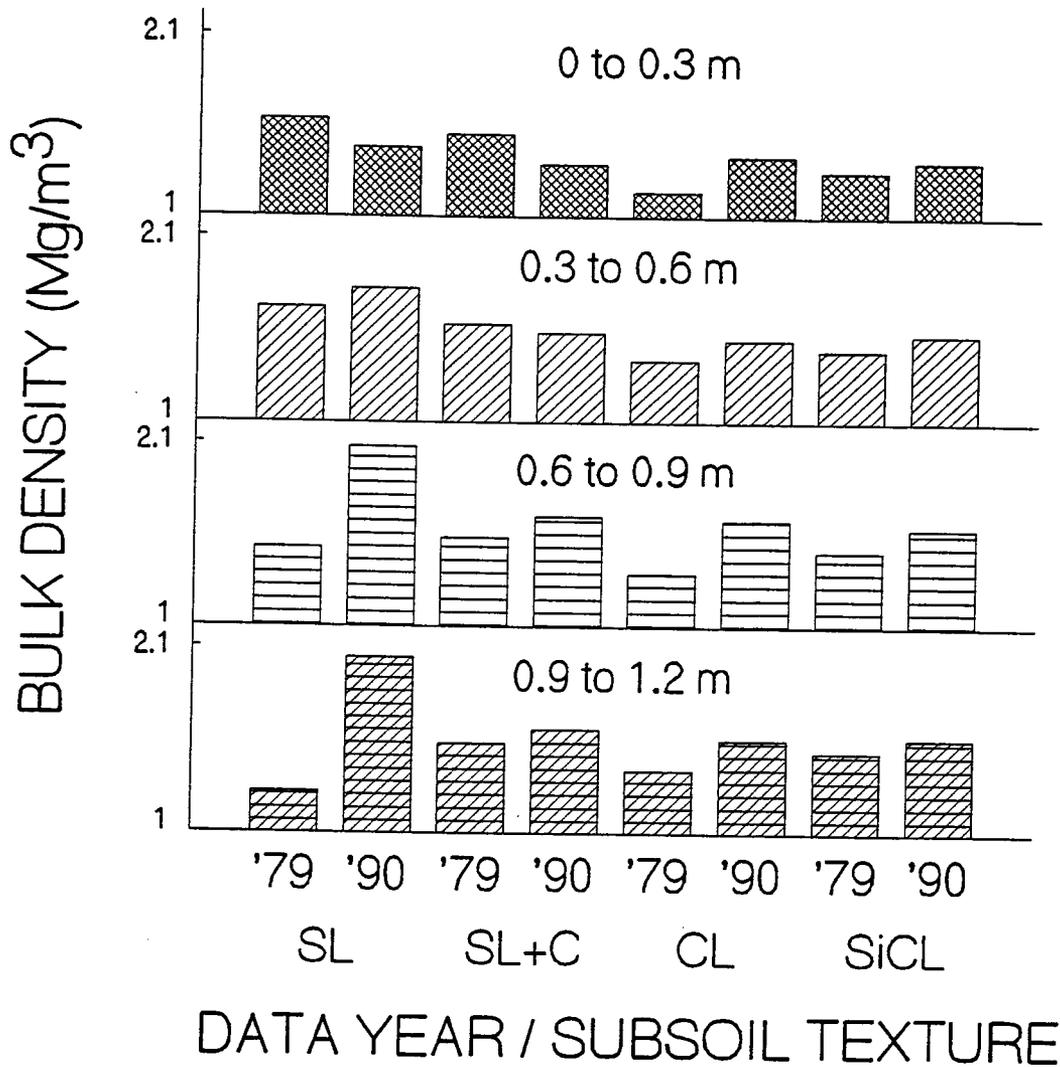


Figure 20. Mean bulk densities by subsoil textures (averaged over topsoil depth) with time at the Falkirk trench site.

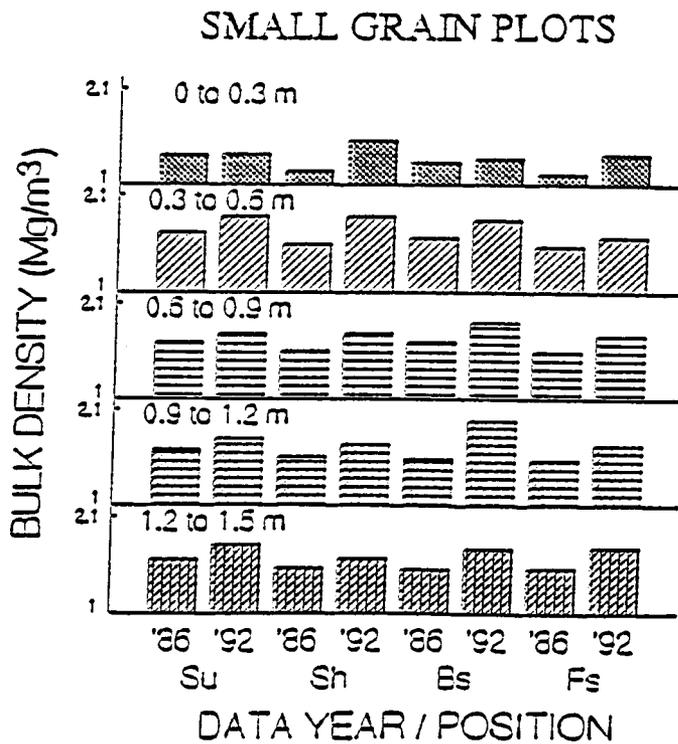
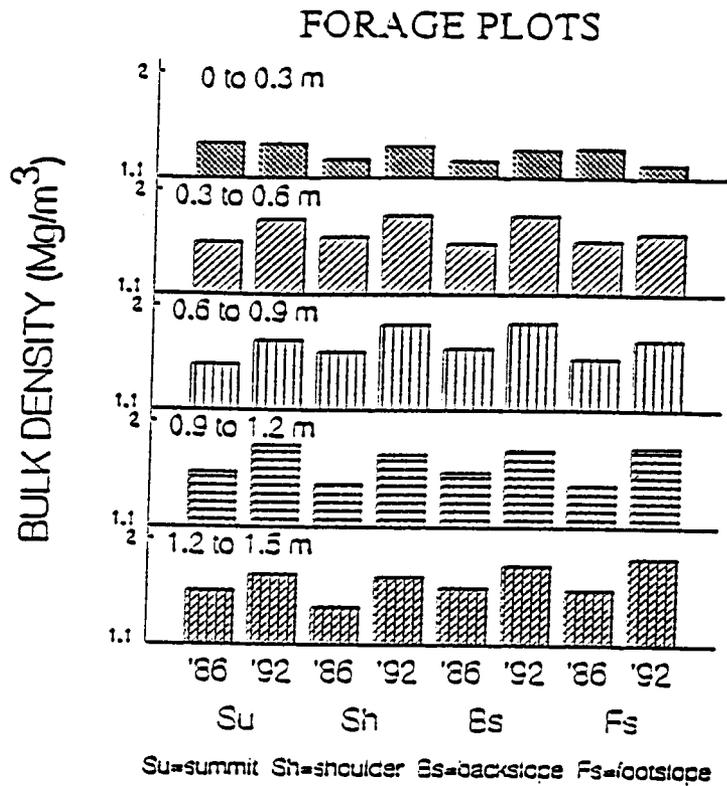
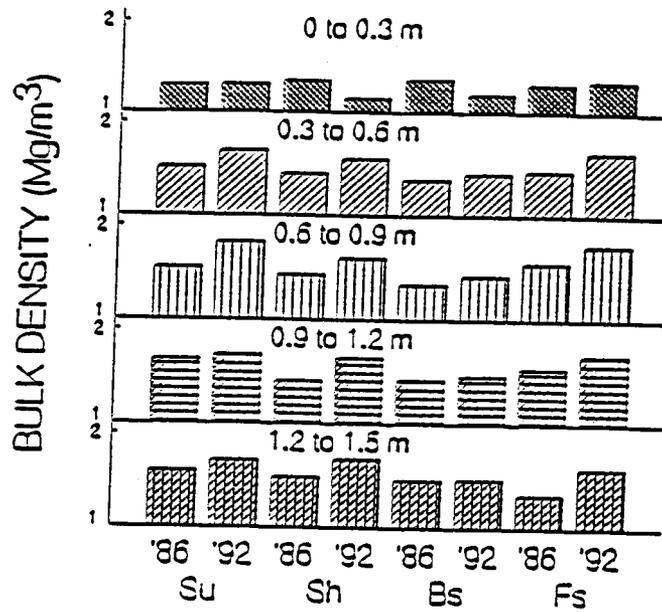


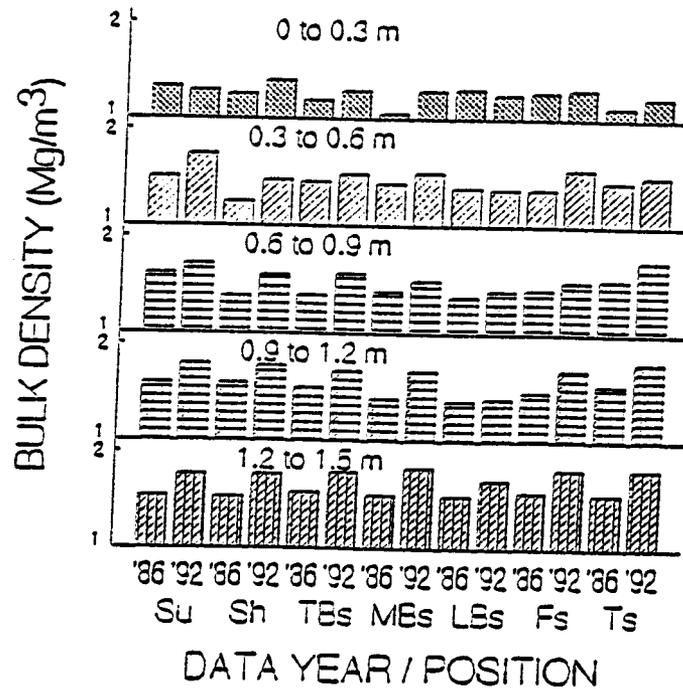
Figure 21. Mean bulk density changes with time by topography position and crop at the Center location.

FORAGE PLOTS



Su=summit Sh=shoulder Fs=footslope Ts=toeslope
 TBs,MEs,LSs=top,middle,lower backslope

SMALL GRAIN PLOTS



DATA YEAR / POSITION

Figure 22. Mean bulk density changes with time by topography position and crop at the Falkirk location.