

Efficacy of Vegetative Filter Strips to Reduce Phosphorous (P) in Runoff From Dairy Waste Application Fields

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Content

- Background Information
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- Materials and Method
- Result and Discussion
- Conclusion

Background Information

- Highly concentrated Dairy operation
- Runoff of pollutants such P from the Waste application fields (WAFs) is a major environmental concern
- Impaired segments of North Bosque River



Environmental Concern

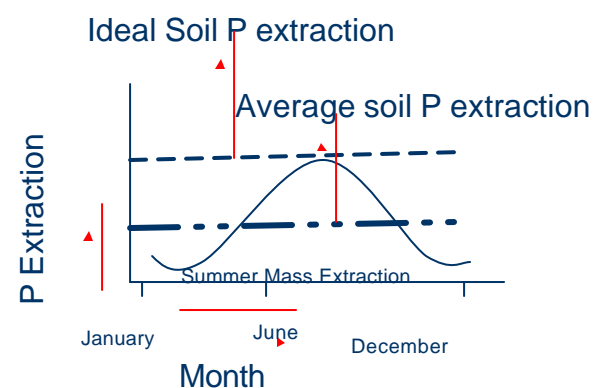
Water quality degradation due to:

- High Phosphorous content
- Accelerated Eutrophication
- Depletion of DO level

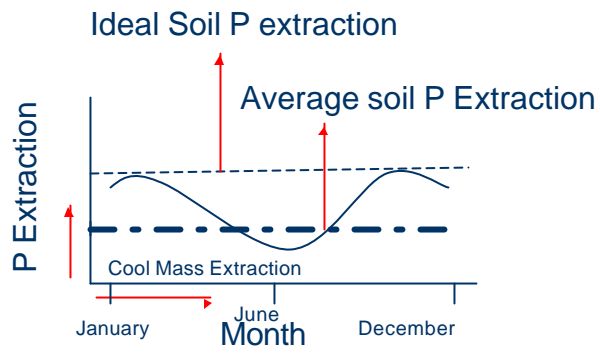
Objectives

- To select the most effective treatment among Sunflower, Coastal Bermuda (CB), Cool Season Grass (CSG) and Warm Season Grass (WSG) in reducing runoff P
- To recommend a combination of both warm and cool season treatments for year round better uptake of P from soil

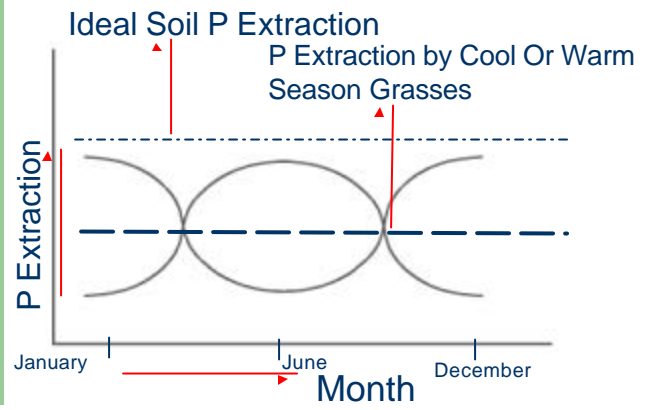
P Extraction by the Warm Season Grasses



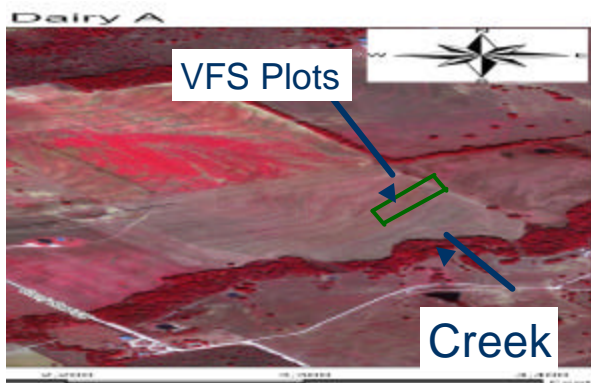
P Extraction by Cool Season Grasses



Combined Effect of P Extraction by Warm and Cool Season Grasses



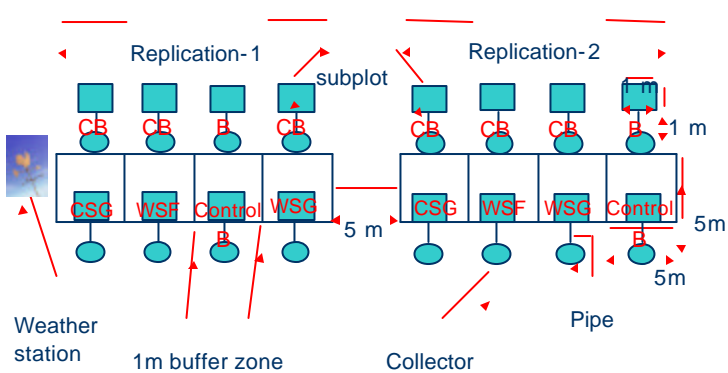
Materials and Methods



VFS Treatments

- Cool Season Grass (CSG)- Wild Rye
- Warm Season Grass (WSG)- Indian Grass, Switch Grass, and Gama Grass
- Warm season forb (WSF)- Sun flower
- Coastal Bermuda (CB)

Schematic of VFS Plots



Field Plots Set-Up



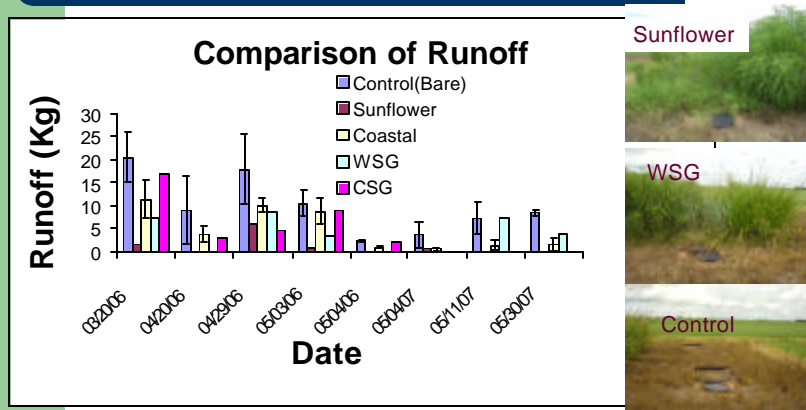
Sampling Protocol

- Barrel water and sediments were weighed to determine runoff mass and volume
- A thoroughly mixed 1-L composite sample collected and stored on ice
- Samples analyzed for TP, SOP and TSS

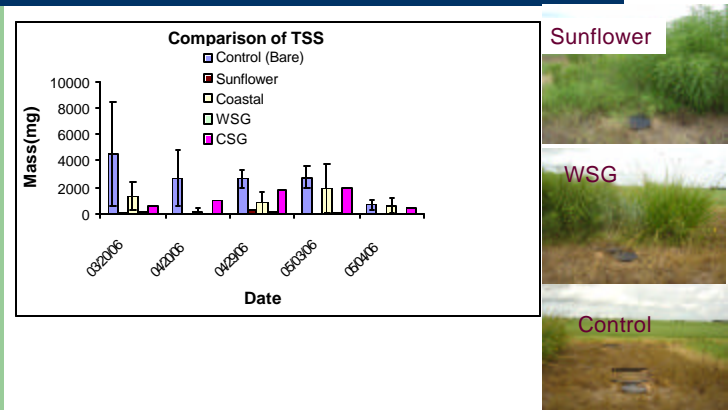
Results and Discussion

Date	Rainfall (cm)
03/20/06	11.4
04/20/06	4.1
04/29/06	5.4
05/03/06	4
05/04/06	2
05/04/07	3.1
05/11/07	4.2
05/30/07	3.4

Comparison of Runoff among Treatments



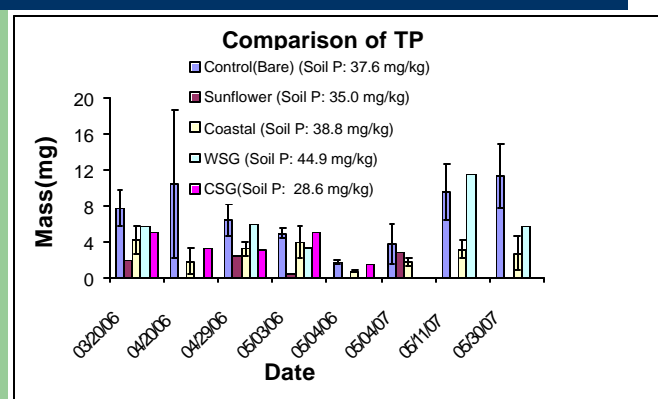
Comparison of TSS among Treatments



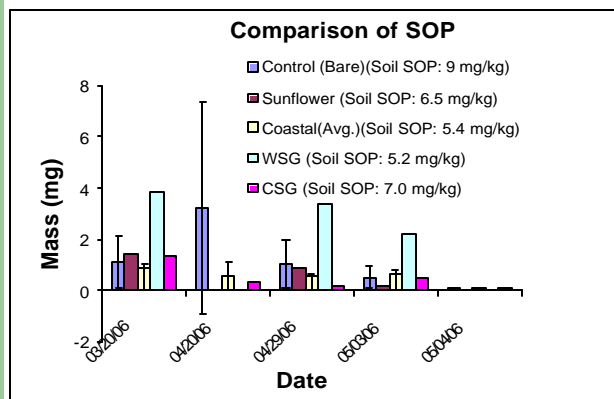
Soil TP and SOP

Plots	TP (mg/kg)	SOP (mg/kg)	% SOP	STDVTP	STDV SOP
Control plot	37.6	9	23.9	11.8	0.9
CSG	28.7	7	24.4	4.9	3.5
Coastal	38.9	5.4	14	13.8	2.3
WSG	44.9	5.1	13.1	17.7	0.07
Sunflower	35	6.5	18.7	7.6	0.6

Comparison of TP among Treatments



Comparison of SOP among Treatments



SOP in Soil & Runoff and TSS Load in Runoff

Parameter	CSG	CB	sunflower	WSG	Control
SOP as % of TP in soil	24.4	14	18.7	13.4	23.9
SOP as % of TP in runoff	13.4	18.8	51.3	64.5	15.2
Mass of Sediment (mg) in runoff	1211	994	142	169	2677

Summary

- Sunflower was the most effective in reducing TP in runoff followed by CB, WSG and CSG
- Lessening of P load in runoff was due to removal of sediment
- Cleaner water was collected in Sunflower and WSG treatment plots

Future Work

- Collection of more runoff data samples from treatment plots
- Tissue analysis of treatment plants

Acknowledgement

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Thank You!

Question?