FNE94-61

AERATION TO IMPROVE SOD DEVELOPMENT

by TIMOTHY J. MARLAND, MARLAND'S HYLAND FARMS

1995

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PROJECT GOALS

EXPERIMENTAL PLOTS USING AN AERWAY AERATOR AS A SOLE TILLAGE TOOL TO PREPARE SEEDBEDS FOR ESTABLISHING FIVE DIFFERENT TYPES OF FORAGES INTO EXISTING ROTATIONAL PASTURE SOD WITHOUT TAKING IT OUT OF PRODUCTION. PLOTS CONSIST OF COMBINATIONS OF AERWAY TILLAGE AND NO-TILL DRILLING, SEEDING WITH A BRILION SEEDER AND SELF SEEDING BY NATURAL SEED DROP.

THE AERATOR WILL ALSO BE USED TO INCORPORATE FERTILIZER, LIMESTONE, LIQUID CALCIUM AND OTHER CHEMICALS USED. AERATION WILL ALSO BE USED TO MAINTAIN STAND AND INCREASE SOD DENSITY.

FARM DESCRIPTION

Marland's Hyland Farms was established in the early 70's. Raising Polled Hereford beef cattle has dominated our efforts on a part time basis for around two decades. Upon completion of my college education in 1985, we became one of the pioneers in the intensive grazing business in our area. Realizing the successfulness of our diligence, we pursued the best means of increasing return on our investments. This lead us to the reduction of grain crops and chemicals, the use of proven pasture forage species, and the use of sod improvement equipment. We presently rent two-thirds of our 100 acre establishment, with 85 acres consisting of rotational pasture and perenial hay crops.

Informational studies will be performed with this equipment. These studies will provide us with a better idea of how to improve profitability of our grass farming efforts. In addition, we hope to prove that this equipment can eventually take place of all or most of our conventional tillage equipment.

COOPERATORS NAMES AND ROLES

SPECIAL THANKS TO THE FOLLOWING SUPPORTERS OF THIS PROJECT

TIM MARLAND, MARLAND'S HYLAND FARMS; SEED AND CHEMICALS, DATA COLLECTION AND LABOR.

JEFF MILLER, ONEIDA COUNTY COOPERATIVE EXTENTION; PLOT LAYOUT, ADVISOR.

LARRY BRAKE, AMERICA'S ALFALFA; ALFAGRAZE ALFALFA, REDLAND III RED CLOVER.

ROADS JOHNSTON, OLDFIELD SEED CO.; GRASSLANDS PUNA CHICKORY.

JOHN DICKERSON, USDA; SWITCHGRASS SEED

DENNIS NIGAARD, FERTRELL FERTILIZER CO.; HIGH BLUE K 1-1-2 FERTILIZER.

PHILLIP D. METZGER, SOUTH CENTRAL NY R.C. & D.; NO-TILL SEEDER.

1)SELF SEEDING PLOT

PROJECT #: 1 PRODUCTION STAGE: 3
FIELD #:1a,b ACRES:5.5 SOIL TYPE:MaC-MARDIN CHANNERY SILT LOAM

PROJECT TITLE:AERATION-vs-NON-AERATION FOR SELF SEEDING CLOVER AND TREFOIL FROM EXISTING STAND.

OBJECTIVES:MEASURE ADVANTAGES/DISADVANTAGES OF AERATION IN SELF SEEDING OF CLOVER AND TREFOIL.

SOIL TEST RESULTS:Ca--7200, P-20, K--70

METHOD AND MATERIALS: 1994

RANDOM SELECTION OF 4 STRIPS TO BE AERATED AND 4 STRIPS TO BE USED AS A CHECK WAS DONE IN THE SPRING OF 1994. POPULATION COUNTS OF RED CLOVER AND TREFOIL WERE GATHERED WITH 1ft X 1ft SQUARE IN SPRING TO DETERMINE A MEAN POPULATION OF EXISTING STAND OF 4.4/sq.ft RED CLOVER AND 1.0/sq.ft. TREFOIL. SPREAD FERTRELL HIGH BLUE K ?-1-? FERTILIER; 175# BEFORE AERATION IN THE SPRING AND 175# BEFORE SECOND AERATION. DESIGNATED STRIPS WERE AERATED AT 10 DEGREE KNIFE SETTING ONCE IN SPRING AND ONCE BEFORE STOCKPILING. FORAGE WAS HARVESTED AS HAY JUNE 25th, GRAZED ON AUGUST 1st, STOCKPILED UNTIL OCTOBER 5th (AFTER SEED DROP) WHEN IT WAS GRAZED. FINAL PLOT COUNTS WERE TAKEN IN SPRING OF 1995.

PLOT STIPS WERE APPROXIMATELY 800ft IN LENGTH. TEN COUNTS WERE MADE IN EACH STRIP WITH AN AVERAGE OF 5.45/sq.ft. FOR RED CLOVER AND 1.15/sq.ft. FOR TREFOIL IN AERATED STRIPS. AN AVERAGE OF 5.08/sq.ft. FOR RED CLOVER AND 1.02/sq.ft FOR TREFOIL IN CHECK STRIPS. RESULTS OF COUNTS INDICATE AN ADVANTAGE IN SOIL AERATION OVER NON-AERATION. AERATING SOD WILL MOST LIKELY PROVE TO BE AN EFFECTIVE MEANS OF INCREASING POPULATION DENSITY OF RED CLOVER AND TREFOIL STANDS ON STOCKPILED PASTURELAND OVER A LONGER PERIOD OF TESTING. THIS PRACTICE WILL CONTINUE TO BE USED ON OUR AND FURTHER POPULATION MONITORING WILL BE DONE TO DETERMINE LONGEVITY EFFECTS OF PRACTICE.

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Project #: 1 Field I.D. #: 1ab Date : 5-14-95

Practice / Counts (Red clover, Trefoil)

	Aerate	Check	Aerate	Check	Aerate	Aerate	Check	Check
Clover	2.00	6.00	9.00	5.00	3.00	6.00	5.00	7.0
Trefoil	0.00	1.00	1.00	1.00	1.00	2.00	1.00	0.0
Clover	6.00	3.00	5.00	3.00	5.00	4.00	3.00	5.0
Trefoil	0.00	0.00	4.00	1.00	0.00	1.00	3.00	0.0
Clover	13.00	7.00	1.00	7.00	8.00	11.00	8.00	2.0
Trefoil	0.00	1.00	3.00	1.00	0.00	1.00	1.00	1.0
Clover	3.00	7.00	6.00	8.00	4.00	4.00	2.00	5.0
Trefoil	5.00	0.00	0.00	4.00	0.00	1.00	1.00	0.0
Clover	7.00	11.00	8.00	2.00	2.00	7.00	5.00	8.0
Trefoil	7.00	5.00	0.00	0.00	2.00	0.00	2.00	2.0
Clover	1.00	5.00	5.00	3.00	4.00	5.00	8.00	3.0
Trefoil	0.00	0.00	1.00	0.00	5.00	0.00	4.00	1.0
Clover	6.00	7.00	4.00	1.00	1.00	8.00	9.00	5.0
Trefoil	3.00	0.00	1.00	0.00	2.00	0.00	0.00	2.0
Clover	2.00	7.00	7.00	8.00	7.00	4.00	4.00	6.0
Trefoil	0.00	3.00	0.00	2.00	0.00	1.00	0.00	0.0
Clover	8.00	1.00	10.00	3.00	4.00	3.00	2.00	5.0
Trefoil	2.00	0.00	0.00	0.00	0.00	2.00	1.00	1.0
Clover	8.00	2.00	7.00	4.00	6.00	4.00	5.00	6.0
Trefoil	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.0
TOTALS	56.00	56.00	62.00	44.00	44.00	56.00	51.00	52.0
	17.00	10.00	10.00	10.00	11.00	8.00	13.00	8.0

Aeration average	Clover	54.50	Per sq. ft	5.45
	Trefoil	11.50		1.15
Check average	Clover	50.75	Per sq. ft	5.08
	Trefoil	10.25		1.02

Field population mean prior to trial application

(r. clover	trefoil)
0.00	2.00
1.00	1.00
6.00	3.00
7.00	2.00
3.00	0.00
9.00	0.00
5.00	2.00
6.00	0.00
7.00	0.00
0.00	0.00

Red Clover avg.	44.00
per sq. ft.	4.40
Trefoil avg.	10.00
per sq. ft.	1.00

3) SWITCHGRASS AERWAY / NO-TILL PLOT

PROJECT #:19 PRODUCTION STAGE: 1
FIELD #:11a ACRES: 1 SOIL TYPE: MaC-MARDIN CHANNERY SILT LOAM

PROJECT TITLE: AERATION-vs-NON AERATION ON WARM SEASON GRASS FOR STAND PERSISTANCE.

OBJECTIVES: MEASURE ADVANTAGES/DISADVANTAGES OF AERATION MAINTENANCE ON SWITCHGRASS ESTABLISHMENT TO IMPROVE COMPETITIVENESS AND STAND PERSISTANCE.

METHODS AND MATERIALS: 1994

AERATION AT 10 DEGREE KNIFE SETTING WAS DONE TWICE AT PERPENDICULAR ANGLES IN FALL '93 (AFTER KILLING FROST). ROUNDUP HERBICIDE WAS SPRAYED @2qt./a ON MAY 20th. 175# OF FERTRELL HIGH BLUE K 1-1-3 FERTILIZER WAS SPREAD PRIOR TO SPRING AERATION. RANDOM SELECTION OF 4 STRIPS TO BE AERATED AND 4 STRIPS TO BE USED AS A CHECK WERE LAID OUT IN SPRING. DESIGNATED STRIPS WERE AERATED ONCE AT 10 DEGREE SETTING. FIELD WAS NO-TILL SEEDED ON JUNE 10th TO CAVE-IN-ROCK SWITCHGRASS AT 8# SEED PER ACRE. SEEDLINGS WERE IDENTIFIED IN SECONDARY LEAF GROWTH STAGE BY COMPARING TO THOSE STARTED IN POTS AT SAME TIME FIELD WAS SEEDED. PLOT COUNTS WERE TAKEN ON JUNE 30th USING A 1ft X 1ft SQUARE, MAKING 10 COUNTS PER STRIP. AFTER WHICH QUACKGRASS AND OTHER GRASSES TOOK OVER THE ENTIRE FIELD. FIELD WAS CUT AUGUST 22nd FOR HAY. 175# FERTILIZER WAS SPREAD AFTER HAY WAS REMOVED.

SEEDLING COUNTS MADE AVERAGED 8.65 PLANTS PER sq. ft. FOR AERATED STRIPS AND 7.88 PLANTS PER sq. ft. FOR NON-AERATED STRIPS. DETERMINATION OF AN ACTUAL ADVANTAGE OR DISADVANTAGE OF AERATION IN THIS PLOT COULD BE BASED ON SEEDLING COUNTS, BUT WILL NOT BE DETERMINED POSITIVE BECOUSE OTHER GRASSES HAVE OVER POPULATED THE STAND TO MAKE FURTHER PLANT COUNTS UNDETERMINABLE. AERATION WILL CONTINUE IN DESIGNATED STRIPS, AND MATURE STAND WILL BY MONITORED TO TRY TO DETERMINE ANY LONGEVITY EFFECTS ON STAND.

AERATION TILLAGE DONE IN LATE FALL OF 1993 WEAKENED SOD PLANTS CAUSING A LATER SPRING GREEN-UP IN 1994. A BETTER BURN-DOWN OF SOD WAS NOTICED IN AERATION STRIPS MADE IN SPRING PRIOR TO SEEDING. THIS METHOD NEEDS A CLOSER LOOK FOR POSSIBLE ADVANTAGES IN BURNDOWN PRACTICES.

Project #: 19 Field I.D. #: 11a Date : 6-30-94

	Practice / Counts Check	Aerate	Aerate	Aerate	Check	Check	Aerate	Check
Switch grass	9.00	10.00	8.00	5.00	14.00	2.00	9.00	1.0
Switch grass	8.00	16.00	14.00	3.00	12.00	12.00	4.00	8.0
	1.00	6.00	11.00	4.00	8.00	4.00	5.00	5.0
	14.00	8.00	5.00	13.00	5.00	10.00	10.00	6.0
	8.00	10.00	10.00	11.00	10.00	18.00	12.00	8.0
	5.00	4.00	16.00	8.00	5.00	8.00	18.00	6.0
	6.00	15.00	8.00	12.00	15.00	15.00	14.00	6.0
	5.00	9.00	1.00	2.00	5.00	9.00	10.00	7.0
	8.00	8.00	5.00	4.00	6.00	8.00	10.00	15.0
	12.00	6.00	6.00	5.00	7.00	4.00	11.00	6.0
TOTALS	76.00	92.00	84.00	67.00	87.00	90.00	103.00	68.0
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0

Aeration average	Switch grass	86.50	Per sq. ft	8.65
Check average	Switch grass	78.75	Per sq. ft	7.88

4)RED CLOVER AERWAY / NO-TILL PLOT

PROJECT #: 27 PRODUCTION STAGE: 1
FIELD #:19b ACRES:2 SOIL TYPE: STOCKBRIDGE-HOWARD GRAVELLY SILT LOAM

PROJECT TITLE: AERATION-vs-NON AERATION FOR NO-TILL CLOVER, CHICKORY ESTABLISHMENT.

OBJECTIVES: MEASURE ADVANTAGES/DISADVANTAGES OF ESTABLISHING CLOVER AND CHICKORY SEED INTO AERATED AND NON AERATED SOD.

SOIL TEST RESULTS:Ca-7200, P-10, K-100, PH-7.2

METHODS AND MATERIALS:1994

ROUNDUP HERBICIDE WAS SPRAYED @2qt./a ON MAY 20th. 175# OF FERTRELL HIGH BLUE K 1-1-2 FERTILIZER WAS SPREAD PRIOR TO SPRING AERATION. RANDOM SELECTION OF 4 STIPS TO BE AERATED AND 4 STIPS TO BE USED AS CHECK WERE LAID OUT IN SPRING OF 1994. DESIGNATED STRIPS WHERE AERATED ONCE AT 10 DEGREE KNIFE ANGLE SETTING. FIELD WAS NO-TILL SEEDED ON JUNE 10th TO RED LAND III RED CLOVER AT 10# PER ACRE, AND GRASSLANDS PUNA CHICKORY AT 1# PER ACRE. FIELD WAS CUT FOR HAY ON AUGUST 22nd. 175# OF FERTRELL 1-1-2 WAS SPREAD ON SEPTEMBER 21st AND GRAZED ON OCTOBER 25th OF 1994.

POPULATION COUNTS WERE MADE IN SPRING OF 1995 USING A 1ft X 1ft SQUARE AND 10 COUNTS WERE MADE IN EACH STRIP. DUE TO AN OPEN WINTER ON THIS WEST FACING SLOPE FROST KILL WAS APPARENT BUT UNDETERMINABLE IN EXTENT. THE FROST KILL EVIDENCE SHOWED MORE SEVERE ON RED CLOVER FURTHER UP THE SLOPE THAN ON LOWER STRIPS, GIVING UNCONCLUSIVE RESULTS ON THIS GIVEN EXPERIMENT. HOWEVER, PUNA CHICKORY COUNTS AVERAGED .65 PLANTS PER sq. ft. FOR AERATED STRIPS, AND .42 PLANTS PER sq. ft AVERAGE FOR CHECK STRIPS SHOWING A POSSIBLE ADVANTAGE TO AERATION FOR THIS SPECIES IN THIS EXPERIMENT.

AERATION IN DESIGNATED STRIPS WILL CONTINUE TO DETERMINE ANY LONGEVITY EFFECTS ON WHAT IS LEFT OF STAND.

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Project #: 27 Field I.D. #: 19b Date : 5-11-95

	Practice / Counts (Red clover, Puna Chickory)							
	Aerate	Aerate	Aerate	Check	Aerate	Check	Check	Check
Clover	6.00	1.00	7.00	0.00	5.00	14.00	13.00	1.0
Chickory	3.00	0.00	0.00	0.00	1.00	1.00	1.00	0.0
Clover	15.00	4.00	1.00	2.00	9.00	8.00	6.00	11.0
Chickory	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.0
Clover	11.00	1.00	8.00	6.00	9.00	0.00	4.00	6.0
Chickory	0.00	0.00	4.00	0.00	1.00	0.00	0.00	4.0
Clover	10.00	1.00	9.00	3.00	2.00	0.00	10.00	3.0
Chickory	0.00	0.00	3.00	0.00	0.00	0.00	1.00	0.0
Clover	5.00	0.00	0.00	11.00	12.00	0.00	12.00	1.0
Chickory	0.00	0.00	1.00	0.00	2.00	0.00	0.00	0.0
Clover	2.00	4.00	7.00	1.00	11.00	1.00	6.00	15.0
Chickory	0.00	0.00	0.00	1.00	1.00	0.00	1.00	0.0
Clover	2.00	0.00	3.00	0.00	8.00	20.00	0.00	15.0
Chickory	0.00	1.00	1.00	0.00	2.00	1.00	1.00	2.0
Clover	5.00	11.00	2.00	11.00	18.00	12.00	14.00	10.0
Chickory	0.00	0.00	0.00	2.00	1.00	0.00	0.00	0.0
Clover	5.00	2.00	2.00	10.00	5.00	0.00	13.00	18.0
Chickory	1.00	1.00	0.00	0.00	0.00	0.00	1.00	0.0
Clover	6.00	0.00	6.00	3.00	6.00	1.00	1.00	12.0
Chickory	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.0
TOTALS	67.00	24.00	45.00	47.00	85.00	56.00	79.00	92.0
	5.00	3.00	10.00	3.00	8.00	2.00	5.00	7.0

Aeration average	Clover	55.25	Per sq. ft	5.53
	Chickory	6.50		.65
Check average	Clover	68.50	Per sq. ft	6.85
	Chickory	4.25		.42

5)ALFALFA AERWAY / NO-TILL PLOT

PROJECT #: 28 PRODUCTION STAGE: 1
FIELD #:19c ACRES:3 SOIL TYPE: STOCKBRIDGE-HOWARD GRAVELLY SILT LOAM

PROJECT TITLE: AERATION-vs-NON AERATION FOR NO-TILL ALFALFA, CHICKORY ESTABLISHMENT.

OBJECTIVES: MEASURE ADVANTAGES/DISADVANTAGES OF ESTABLISHING ALFALFA AND CHICKORY SEED INTO AERATED AND NON AERATED SOD.

SOIL TEST RESULTS:Ca-7200, P-10, K-100, PH-7.2

METHODS AND MATERIALS:1994 COST$

ROUNDUP HERBICIDE WAS SPRAYED @2qt./a ON MAY 20th. 175# OF FERTRELL HIGH BLUE K 1-1-2 FERTILIZER WAS SPREAD PRIOR TO SPRING AERATION. RANDOM SELECTION OF 4 STIPS TO BE AERATED AND 4 STIPS TO BE USED AS CHECK WERE LAID OUT IN SPRING OF 1994. DESIGNATED STRIPS WHERE AERATED ONCE AT 10 DEGREE KNIFE ANGLE SETTING. FIELD WAS NO-TILL SEEDED ON JUNE 10th TO ALFAGRAZE ALFALFA AT 15# PER ACRE, AND GRASSLANDS PUNA CHICKORY AT 1# PER ACRE. FIELD WAS CUT FOR HAY ON AUGUST 22nd. 175# OF FERTRELL 1-1-2 WAS SPREAD ON SEPTEMBER 21st AND GRAZED ON OCTOBER 25th OF 1994.

A PRELIMINARY POPULATION COUNT USING A 1ft X 1ft SQUARE, 10 COUNTS IN EACH STRIP WAS MADE ON JUNE 29th WHEN ALFALFA PLANTS WERE THREE TO SIX INCHES IN HIGHT. AN AVERAGE OF 14.12 ALFALFA PLANTS PER sq. ft. AND 1.4 CHICKORY PLANTS PER sq. ft. ON AERATED STRIPS, AND 12.38 ALFALFA PLANTS, .95 CHICKORY PLANTS WERE COUNTED PER sq. ft. ON CHECK STRIPS. POPULATION COUNTS WERE AGAIN MADE IN SPRING OF 1995 . 7.62 ALFALFA PLANTS PER sq. ft. AND .75 CHICKORY PLANTS PER sq. ft. WERE COUNTED IN AERATED STRIPS, 4.35 ALFALFA PLANTS AND .62 CHICKORY ON CHECK STIPS. NO APPARENT TREND CAN BE DETERMINED BETWEEN THE TWO COUNTS, HOWEVER, IT IS POSSITIVE TO SEE AN ADVANTAGE IN AVERAGE POPULATION ON AERATED SOD --vs- NON AERATED. SEVERE LEAF HOPPER DAMAGE ON ALFALFA OCCURED IN AUGUST, WITH HEAVIEST DAMAGE SEEN ON TOP OF HILL. DUE TO AN OPEN WINTER ON THIS WEST FACING SLOPE FROST KILL WAS APPARENT BUT UNDETERMINABLE IN EXTENT. A COUNT WAS ALSO MADE ON THE BEST LOOKING SPOT IN THE FIELD (WHERE AN OLD STONE PILE WAS REMOVED) IN SPRING SHOWING A POPULATION DENSITY OF 15 ALFAFLA PLANTS PER sq. ft. AND 2 PLANTS FOR CHICKORY. THIS SHOWS AT LEAST A CLOSE TO IDEAL SEEDLING CATCH ON AERATED PLOTS OVER CHECK BEFORE FROST AND OTHER DAMAGE OCCURED.

AERATION IN DESIGNATED STRIPS WILL CONTINUE TO DETERMINE ANY LONGEVITY EFFECTS ON WHAT IS LEFT OF STAND.

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Project #: 28 Field I.D. #: 19c Date : 5-25-95

	Practice / Counts (Alfalfa, Puna Chickory)							
	Aerate	Check	Aerate	Check	Check	Check	Aerate	Aerate
Alfalfa	4.00	8.00	14.00	3.00	7.00	0.00	3.00	1.0
Chickory	0.00	0.00	0.00	1.00	0.00	0.00	2.00	0.0
Alfalfa	8.00	3.00	11.00	6.00	8.00	4.00	2.00	3.0
Chickory	0.00	0.00	0.00	1.00	1.00	0.00	2.00	2.0
Alfalfa	11.00	3.00	9.00	0.00	1.00	1.00	11.00	10.0
Chickory	0.00	0.00	1.00	0.00	1.00	0.00	1.00	0.0
Alfalfa	9.00	6.00	13.00	4.00	0.00	8.00	9.00	7.0
Chickory	0.00	0.00	1.00	1.00	1.00	0.00	0.00	0.0
Alfalfa	8.00	10.00	11.00	9.00	2.00	4.00	12.00	12.0
Chickory	1.00	1.00	0.00	2.00	0.00	2.00	0.00	1.0
Alfalfa	4.00	9.00	9.00	5.00	5.00	5.00	9.00	8.0
Chickory	0.00	1.00	2.00	0.00	0.00	0.00	2.00	1.0
Alfalfa	4.00	2.00	0.00	1.00	1.00	2.00	3.00	8.0
Chickory	1.00	1.00	1.00	0.00	3.00	0.00	3.00	1.0
Alfalfa	0.00	3.00	9.00	2.00	9.00	15.00	21.00	8.0
Chickory	0.00	3.00	0.00	0.00	0.00	2.00	1.00	0.0
Alfalfa	7.00	5.00	2.00	2.00	6.00	2.00	14.00	3.0
Chickory	1.00	1.00	0.00	1.00	1.00	1.00	6.00	0.0
Alfalfa	12.00	6.00	1.00	2.00	1.00	4.00	8.00	7.0
Chickory	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
TOTALS	67.00	55.00	79.00	34.00	40.00	45.00	92.00	67.0
	3.00	7.00	5.00	6.00	7.00	5.00	17.00	5.0

Aerate 10 setting average Alfalfa 76.25 Per sq. ft 7.62
Chickory 7.50 .75

Aerate 0 setting average Alfalfa 43.50 Per sq. ft 4.35
Chickory 6.25 .62

Preliminary field count taken 6-30-94

145.00	142.00	120.00	139.00	82.00	132.00	138.00	162.0
19.00	20.00	15.00	7.00	4.00	7.00	10.00	12.0

Aerate 10 setting average Alfalfa 141.25 Per sq. ft 14.12
Chickory 14.00 1.40

Alfalfa 123.75 Per sq. ft 12.38
Chickory 9.50 .95

Best seed catch area in field - around old rockpile
Alfalfa 15.00
Chickory 2.00

6) CHICKORY SEEDING PLOT

PROJECT #: 30 PRODUCTION STAGE: 2
FIELD #: 26a, b, c ACRES: 5.5 SOIL TYPE: SgC-STOCKBRIDGE CHANNERY SILT LOAM

PROJECT TITLE: AERATE TO ESTABLISH PUNA CHICKORY INTO EXISTING SOD

OBJECTIVES: DETERMINE BEST OF TWO KNIFE ANGLE SETTINGS OF AERWAY TILLAGE FOR FALL INTERSEEDING PUNA CHICKORY INTO EXISTING SOD.

SOIL TEST RESULTS: Ca-800, P-5, K-90

METHODS MATERIALS: 1994

FERTRELL HIGH BLUE K 1-1-2 FERTILIZER WAS SPREAD AT 175# PER ACRE ON MAY 14th. FIELD WAS CUT FOR HAY ON JUNE 20th, GRAZED ON JULY 13th. RANDOM SELECTION OF 4 STRIPS TO BE AERATED AT 10 DEGREE KNIFE ANGLE SETTING AND 4 STRIPS TO BE AERATED AT 0 DEGREE SETTING WERE LAID OUT AND AERATED TWO TIMES EACH ON JULY 30th. HIGH CALCIUM LIMESTONE WAS SPREAD ON AUGUST 1st AT 2 TON PER ACRE AND SPRAYED LIQUID CALCIUM AT 1gl. PER ACRE. ANOTHER 175# PER ACRE OF FERTRELL 1-1-2 FERTILIZER WAS SPREAD.

BECOUSE WE WERE UNABLE TO WORK UP ENOUGH SOIL WITH TWO PASSES TO GET GOOD CONTACT WITH SEED, WE AERATED EACH STRIP TWICE MORE AT DESCRIBED SETTING. FIELD WAS PLANTED WITH A BRILION SEEDER ON AUGUST 8th WITH 8#/a REDLAND III RED CLOVER ON ONE HALF OF FIELD AND 15#/a ALFAGRAZE ALFALFA ON THE OTHER HALF. THIS SEED WAS USED AS A CARRIER TO APPLY 1#/a OF GRASSLANDS PUNA CHICKORY ON THE ENTIRE FIELD. THIS FIELD WAS THEN LEFT UNHARVESTED UNTIL MARCH 27, 1995.

FIELD COUNTS ON RED CLOVER AND PUNA CHICKORY WERE MADE ON MAY 25th USING A 1ft. X 1ft. SQUARE AND MAKING 10 COUNTS PER STRIP. THE HEAVIER SOD CUT MADE BY THE 10 DEGREE SETTING ANGLE ALOWED 3.7 CLOVER PLANTS PER sq. ft. AND .12 CHICKORY PER sq. ft. TO ESTABLISH. WHERE THE LIGHTER 0 DEGREE SETTING ALOWED 3.2 CLOVER PLANTS AND .1 CHICKORY PLANTS TO ESTABLISH. ALFALFA SIDE WAS EVEN LESS DESIRABLE. EVEN THOUGH A SLIGHT ADVANTAGE OF HEAVIER KNIFE CUT WAS APPARENT OVER LIGHTER CUT THIS METHOD PROVES UNECONOMICALLY FEASABLE IN FALL SEEDING. HOWEVER, SPRING SEEDINGS USING 10 DEGREE ANGLE CUT SHOULD BE TESTED TO DETERMINE IF ANY ECONOMICAL RESULTS SHOULD MERRIT THE USE OF THIS PRACTIC ON SPRING ESTABLISHMENTS.

IN OUR EFFORTS TO WORK FIELD TO GET ENOUGH SOIL FOR SEED CONTACT TWO THINGS OCCURED: 1) THE SOD IN THE 10 DEGREE ANGLE SETTING ROLLED UP IN CLUMPS LEAVING THE GROUND UNEVEN. THIS MAY BE PREVENTABLE BY MAKING EACH SUBSEQUENT PASS AT A

PERPENDICULAR ANGLE WITH THE PREVIOUS ONE; 2) THE SECOND THING THAT OCCURED WAS ON THE HEADLANDS WHERE AERWAY WAS NOT LIFTED WHILE MAKING PASSES ACROSS STRIPS, CREATING A MOORE IDEAL SEED BED WITH AT LEAST 4 PASSES AT EACH KNIFE SETTING. (THE REASON I AM POINTING THIS OUT IS BECAUSE WHEN I MADE 10 COUNTS ON THE HEADLANDS AND AVERAGED 15.7 CLOVER PLANTS /sq. ft. AND 2.7 CHICKORY PLANTS /sq. ft. WHICH IS A MORE IDEAL STAND CATCH). OVER-ALL THE EXISTING SOD PLANTS ON THE HEADLANDS BOUNCED BACK AND REMAINED PRODUCTIVE EVEN AFTER SOIL WAS WORKED UP ENOUGH TO ESTABLISH NEW SEEDING.

EVIDENCE SHOWED DARKER GREEN COLOR IN THE 10 DEGREE SETTING STRIPS, INDICATING GREATER SOD DECAY BUT ACTUAL CAUSE FOR COLOR CHANGE WAS NOT TESTED.

Project #: 30 Field I.D. # 26abcDate : 5-11-95

Practice / Counts (Red clover, Puna Chickory)

	Aerate0	Aerate10	Aerate10	Aerate0	Aerate0	Aerate10	Aerate10	Aerate0
Clover	5.00	8.00	4.00	0.00	1.00	12.00	9.00	1.0
Chickory	1.00	0.00	0.00	0.00	0.00	1.00	1.00	0.0
Clover	5.00	2.00	0.00	2.00	2.00	5.00	0.00	5.0
Chickory	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Clover	2.00	3.00	2.00	6.00	6.00	1.00	0.00	1.0
Chickory	0.00	0.00	0.00	0.00	2.00	1.00	0.00	0.0
Clover	3.00	6.00	0.00	2.00	5.00	1.00	8.00	2.0
Chickory	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Clover	0.00	8.00	4.00	7.00	3.00	2.00	0.00	0.0
Chickory	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.0
Clover	1.00	2.00	1.00	1.00	3.00	2.00	0.00	0.0
Chickory	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Clover	7.00	2.00	0.00	0.00	2.00	11.00	4.00	4.0
Chickory	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Clover	7.00	3.00	0.00	2.00	7.00	3.00	0.00	5.0
Chickory	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Clover	2.00	5.00	2.00	3.00	2.00	8.00	1.00	4.0
Chickory	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Clover	5.00	9.00	3.00	7.00	2.00	9.00	8.00	6.0
Chickory	0.00	1.00	0.00	1.00	0.00	0.00	0.00	0.0
TOTALS	37.00	48.00	16.00	30.00	33.00	54.00	30.00	28.0
	1.00	2.00	0.00	1.00	2.00	2.00	1.00	0.0

Aerate 10 setting average	Clover	37.00	Per sq. ft	3.70
	Chickory	1.25		.12
Aerate 0 setting average	Clover	32.00	Per sq. ft	3.20
	Chickory	1.00		.10

Population count taken from headlands where soil was tilled more times (Areway was not lifted on headlands)

Clover	157.00	Per sq. ft	15.70
Chickory	27.00		2.70

2)ALFALFA / CHICKORY INTERSEEDING PLOT

PROJECT #: 6 PRODUCTION STAGE: 1
FIELD #:3a ACRES:2 SOIL TYPE:LsB-LANSING GRAVELY SILT LOAM

PROJECT TITLE: AERATE AT DIFFERENT KNIFE ANGLES TO INTERSEED WHOLES IN ALFALFA STAND.

OBJECTIVES: DETERMINE BEST OF TWO KNIFE ANGLE SETTINGS OF AERWAY TILLAGE FOR FALL INTERSEEDING TO RE-ESTABLISH ALFALFA IN WHOLES WHERE STAND HAS THINNED OUT
and
TO INTERSEED PUNA CHICKORY.

METHODS AND MATERIALS: 1994 COST$

FERTRELL HIGH BLUE K 1-1-2 FERTILIZER WAS SPREAD AT 175# PER ACRE ON MAY 14th. POPULATION COUNTS WERE MADE WITH A 1ft. X 1ft. SQUARE TO DETERMINE A MEAN POPULATION OF EXISTING ALFALFA SOD. FIELD WAS CUT FOR HAY ON JUNE 17th AND ON JULY 31st, AERATED AT 5 DEGREE KNIFE ANGLE SETTING ON JUNE 19th. ANOTHER 175# PER ACRE OF FERTRELL 1-1-2 FERTILIZER WAS SPREAD. RANDOM SELECTION OF 4 STRIPS TO BE AERATED AT 10 DEGREE KNIFE ANGLE SETTING AND 4 STRIPS TO BE AERATED AT 0 DEGREE SETTING WERE LAID OUT AND AERATED TWO TIMES EACH ON AUGUST 6.

THIS 8 YEAR OLD ALFALFA/ORCHARDGRASS STAND THINNED OUT BUT IS STILL FAIRLY PRODUCTIVE. THE SOIL IS ALSO VERY LOAMY. WE FELT WE HAD ENOUGH SOIL WITH THREE PASSES TO GET GOOD CONTACT WITH SEED BUT WE AERATED EACH STRIP ONCE MORE AT DESCRIBED SETTINGS SO WE COULD HAVE SAME APPLICATION AS OTHER PLOTS BEING TESTED THIS WAY. FIELD WAS PLANTED WITH A BRILION SEEDER ON AUGUST 8th WITH 15#/a ALFAGRAZE ALFALFA AND 1#/a OF GRASSLANDS PUNA CHICKORY.

FIELD COUNTS ON ALFALFA AND PUNA CHICKORY WERE MADE ON MAY 16, 1995 USING A 1ft. X 1ft. SQUARE AND MAKING 10 COUNTS PER STRIP. IN THE 10 DEGREE SETTING STRIPS: 5.28 ALFALFA PLANTS PER sq. ft. AND .42 CHICKORY PER sq. ft. WHERE THE 0 DEGREE SETTING SHOWED 4.8 ALFALFA PLANTS AND .97 CHICKORY PLANTS. ALL ALALFA PLANTS, BOTH MATURE AND SEEDLINGS WERE COUNTED TOGETHER AND NOT SEPARATED OUT. HOWEVER, THE SOD IN THE 10 DEGREE ANGLE SETTING ROLLED UP IN CLUMPS LEAVING THE GROUND UNEVEN AND CULTIVATING MOST OF THE OLD ALFALFA OUT OF THE GROUND. EVIDENCE SHOWED DARKER GREEN COLOR IN THE 10 DEGREE SETTING STRIPS, INDICATING GREATER SOD DECAY.

EVEN THOUGH A SLIGHT ADVANTAGE OF HEAVIER KNIFE CUT (10 DEGREE) WAS APPARENT OVER LIGHTER CUT (0 DEGREE) IN ALFALFA SEEDING CATCH, PUNA CHICKORY COUNTS AVERAGED HIGHER IN 0 DEGREE KNIFE ANGLE OVER 10 DEGREE SETTING. HOWEVER, THE AVERAGE ALFALFA COUNT WAS LOWER THAN THE FIELD MEAN IN 0

DEGREE STRIPS AND THE 10 DEGREE PLOT HAD GREATER EVIDENCE OF REDUCED OLD STAND DUE TO TILLAGE AND INCREASED PROBABILITY OF NEW SEEDLING ESTABLISHMENT BECOUSE OF EXPOSED SOIL. PUNA CHICKORY AVERAGES IN BOTH PLOTS WERE LESS THAN DESIRABLE ACCORDING TO A 2.35/sq. ft. COUNT ON HEADLANDS WHERE SOIL WAS TILLED MORE (AERWAY WAS NOT LIFTED ON HEADLANDS WHEN TILLING STRIPS).

FIELD WAS GRAZED MAY 18, 1995. AERATION @5 DEGREE SETTING WILL CONTINUE TO DETERMINE ANY LONGEVITY EFFECTS ON STAND PERSISTANCE. ALSO, THIS PRACTICE MAY PROVE MORE ECONOMICAL IN THE SPRING AND WILL BE TRIED ON STANDS WITH LOWER ORCHARDGRASS POPULATIONS.

Project #: 6 Field I.D. #: 3a Date : 5-12-95

Practice / Counts (Alfalfa, Puna Chickory)

	Aerate10	Aerate0	Aerate0	Aerate10	Aerate0	Aerate10	Aerate0	Aerate10
Alfalfa	4.00	5.00	4.00	0.00	9.00	2.00	2.00	1.0
Chickory	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.0
Alfalfa	1.00	5.00	2.00	4.00	8.00	2.00	0.00	7.0
Chickory	2.00	0.00	1.00	0.00	1.00	0.00	2.00	0.0
Alfalfa	7.00	3.00	4.00	9.00	5.00	4.00	11.00	7.0
Chickory	1.00	0.00	3.00	0.00	3.00	0.00	0.00	0.0
Alfalfa	15.00	2.00	8.00	1.00	8.00	7.00	5.00	12.0
Chickory	3.00	2.00	0.00	0.00	3.00	0.00	0.00	0.0
Alfalfa	2.00	0.00	2.00	9.00	9.00	0.00	4.00	13.0
Chickory	2.00	0.00	0.00	0.00	2.00	0.00	0.00	1.0
Alfalfa	4.00	15.00	9.00	3.00	5.00	11.00	1.00	3.0
Chickory	1.00	2.00	0.00	0.00	5.00	0.00	0.00	0.0
Alfalfa	6.00	6.00	6.00	2.00	4.00	2.00	10.00	11.0
Chickory	0.00	0.00	7.00	0.00	2.00	0.00	0.00	0.0
Alfalfa	5.00	4.00	3.00	0.00	0.00	5.00	3.00	8.0
Chickory	4.00	0.00	2.00	0.00	1.00	0.00	0.00	0.0
Alfalfa	6.00	5.00	2.00	9.00	5.00	6.00	0.00	2.0
Chickory	1.00	0.00	2.00	0.00	0.00	0.00	0.00	1.0
Alfalfa	7.00	2.00	6.00	5.00	4.00	5.00	6.00	4.0
Chickory	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
TOTALS	57.00	47.00	46.00	42.00	57.00	44.00	42.00	68.0
	15.00	4.00	15.00	0.00	18.00	0.00	2.00	2.0

Aerate 10 setting average	Alfalfa	52.75	Per sq. ft	5.28
	Chickory	4.25		.42
Aerate 0 setting average	Alfalfa	48.00	Per sq. ft	4.80
	Chickory	9.75		.97

Field population mean prior to trial application
(alfalfa)

4.00
5.00
1.00
4.00
3.00
7.00
4.00
4.00
7.00
10.00

Alfalfa avg. 49.00
per sq. ft. 4.90

HOW MY AERATOR USE IN SEEDING ESTALISHMENT EXPERIMENTS IS ADVISED TO OTHERS

THE MAIN ADVICE GIVEN WHEN SEED IS SPREAD AFTER AERWAY TILLAGE IS TO MAKE SURE ENOUGH SOIL IS WORKED UP TO ESTABLISH GOOD SOIL AND SEED CONTACT.

THE PURCHASE OF AN AERWAY AERATOR IS A WORTH WHILE INVESTMENT ESPECIALLY IF YOU DO NOT ALREADY HAVE CONVENTIONAL TILLAGE EQUIPMENT BECOUSE IT VERY WELL MAY PROVE TO REPLACE THEM IN GRASSLAND FARMING.

ADDITIONAL ADVICE WILL BE GIVEN AS EXPERIMENTATION CONTINUES.

OUTREACH PROGRAM

ON SATURDAY, APRIL 8, 1995 I GAVE A PRESENTATION AT THE 11th ANNUAL SYMPOSIUM ON AGRICULTURE ECOLOGY. A TWENTY MINUTE DISCUSSION DETAILING WHAT AN AERWAY AERATOR IS; WHAT PROJECTS WERE BEING TESTED AND WHAT INSPIRED US TO CHOOSE THESE PROGECTS; AND WHAT RESULTS COULD BE DETERMINED AT THAT TIME.

A DICUSION ON AERWAY TILLAGE WILL BE MADE AT GRAZIERS MEETING THIS SUMMER IN MORRISVILLE, NY AREA, AT TILLAGE PRACTICES SEMINAR IN NELSON NY IN APRIL 1996, AND AT GRAZERS TOUR AT OUR FARM IN 1996.

A COPY OF THIS PROJECT WILL ALSO BE SENT TO EACH COOPERATOR LISTED ABOVE AS WELL AS MIKE WELSHCO, MADISON COUNTY COOPERATIVE EXTENTION AND DAN FLAHERTY, BROME COUNTY COOPERATIVE EXTENTION, AND ANYONE ELSE THAT INQUIRES.