GROUNDHOG

THE BETTER WAY . . .

TO REVITALIZE THE SOIL AND INCREASE YOUR YIELD

The Groundhog is an utility implement that relieves compaction, aerates, cultivates and renovates. It can function as a rotary hoe, a disc, a roller and a harrow. It saves fuel, time and fertilizer.

The Groundhog increases water soakage, bacteria life and root growth. It is an implement for dairy pastureland, grasslands, horse paddocks, general field crops, vegetable production, orchards, vineyards, and turfgrass.

The Groundhog will increase your profits through lower costs and higher yields.

THE PIONEER IN LOW ENERGY FARMING

What is the 'Groundhog'

The Groundhog was developed in New Zealand primarily for pasture renovation. It consists of a rugged tubular steel frame which incorporates a weight box, and tined rollers set into bearing blocks which can be offset. The rollers are ground driven (power is not PTO supplied) and penetration is determined by the addition of weight. It can be used in place of an aerator, rotovator, rotary hoe, disc, cultivator and roller.

What does the 'Groundhog' do?

The Groundhog can be used to aerate, cultivate, renovate and roll. It prepares seed-bed, provides a pathway for fertilizer and lime movement, controls erosion, and opens up the soil to relieve compaction and provide optimum conditions for root growth and maximum yield.

How does the 'Groundhog' work?

The unique, patented Groundhog tine design aerates the soil through a cultivation action in the ground. As well as leaving a void for air and moisture penetration, the tine-action shatters the ground between the tines thereby producing a soil structure well suited to new root growth while providing air, moisture, and fertilizer to the roots through improved capillary action.

What are the advantages of the 'Groundhog'?

LOW COST

- The Groundhog is not PTO driven, therefore capital costs are low.
- The Groundhog has only one moving part, therefore maintenance costs are low.
- The Groundhog is not dragged through the soil, therefore horsepower requirements and associated fuel costs are low.

LONG LIFE

- The Groundhog tines are high strength, hardened steel for maximum life.

EASY MAINTENANCE

- The only maintenance items are the bearings which require minimal lubrication.

UTILITY IMPLEMENT

- The Groundhog will aerate, disc, cultivate and roll.

SAVINGS

- Use of the Groundhog saves time, money, and fertilizer. It increases water percolation, biological activity and root growth.

The Groundhog has been designed to look after that part of the soil which gives you your income.
This is the top seven inches.

SOIL – "Our Most Valuable Asset"

All plants require a fertile soil in which to grow, but fertility alone is not enough. Plants also need water and air to produce a good crop. Adequate soil moisture is necessary for a good yield. Lack of water or too much water both adversely affect yield.

Air within the soil is necessary for plant root systems to utilize the nutrients. In the absence of air, the root system loses its ability to utilize the applied fertilizers and lime which are therefore wasted.

Soil exhibits various properties which can be grouped under 3 headings – biological, physical and chemical. Of these, chemical properties are the least important. Soil fertility contributes only about 5–10% toward total crop production. The other 90–95% comes from the physical and biological components of the soil.

The three properties are very closely related so that a change in any one of them may automatically cause a change in the other two. For example, very hard, compacted soil which is loosened by the Groundhog contains more air which increases the biological activity. This, in turn, causes an increase in the availability of plant food nutrients, and the soil becomes more fertile. The result is better root development and more upper plant growth at no additional cost.

Layers of compaction occur in all soils as a result of today's primary and secondary tillage practices, vehicular traffic and heavy stocking. These hard layers slow down water and air movement within the soil restricting root growth and development.

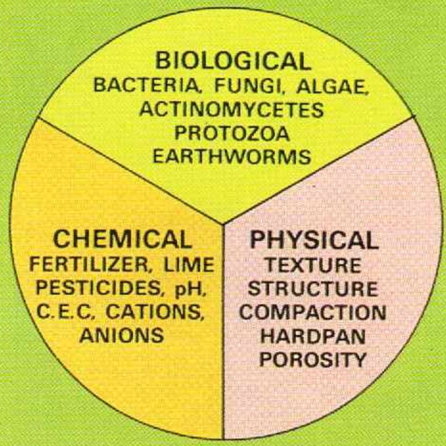
The historic reason for tilling the soil is to manage the residue from the last crop and provide a seed-bed for the next. However, besides promoting soil erosion, this practice produces more compaction and the buried trash is not likely to be converted into humus as the soil micro-organisms do not have the air required for conversion. Use of the Groundhog relieves compaction, promotes air and water movement, and mixes crop residue which improves aerobic microbial decomposition resulting in good quality humus formation. As well, the Groundhog is used to incorporate herbicides, fertilizers and lime into the soil.

Crops growing on loose, well aerated soils will develop extensive root systems that reach into all portions of the soil profile. Selecting the Groundhog is the key to putting your soil in good condition, and keeping it productive in the future.

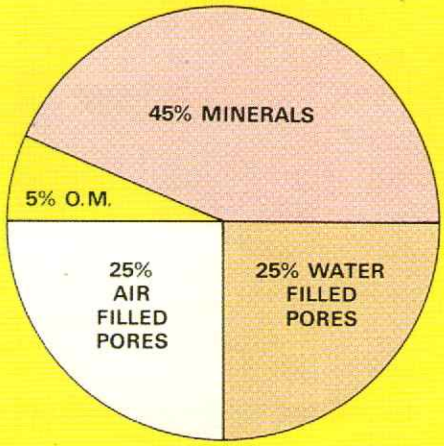
"FEED THE SOIL – NOT THE CROP"

Patented NZ:	192473/193480/193768
UK:	No. 1146472
USA:	No. 4383580
AUS:	No. 534400
CAN:	No. 1173286/84
JAP:	No. 686716/1785953

SOIL COMPONENTS AND YIELDS



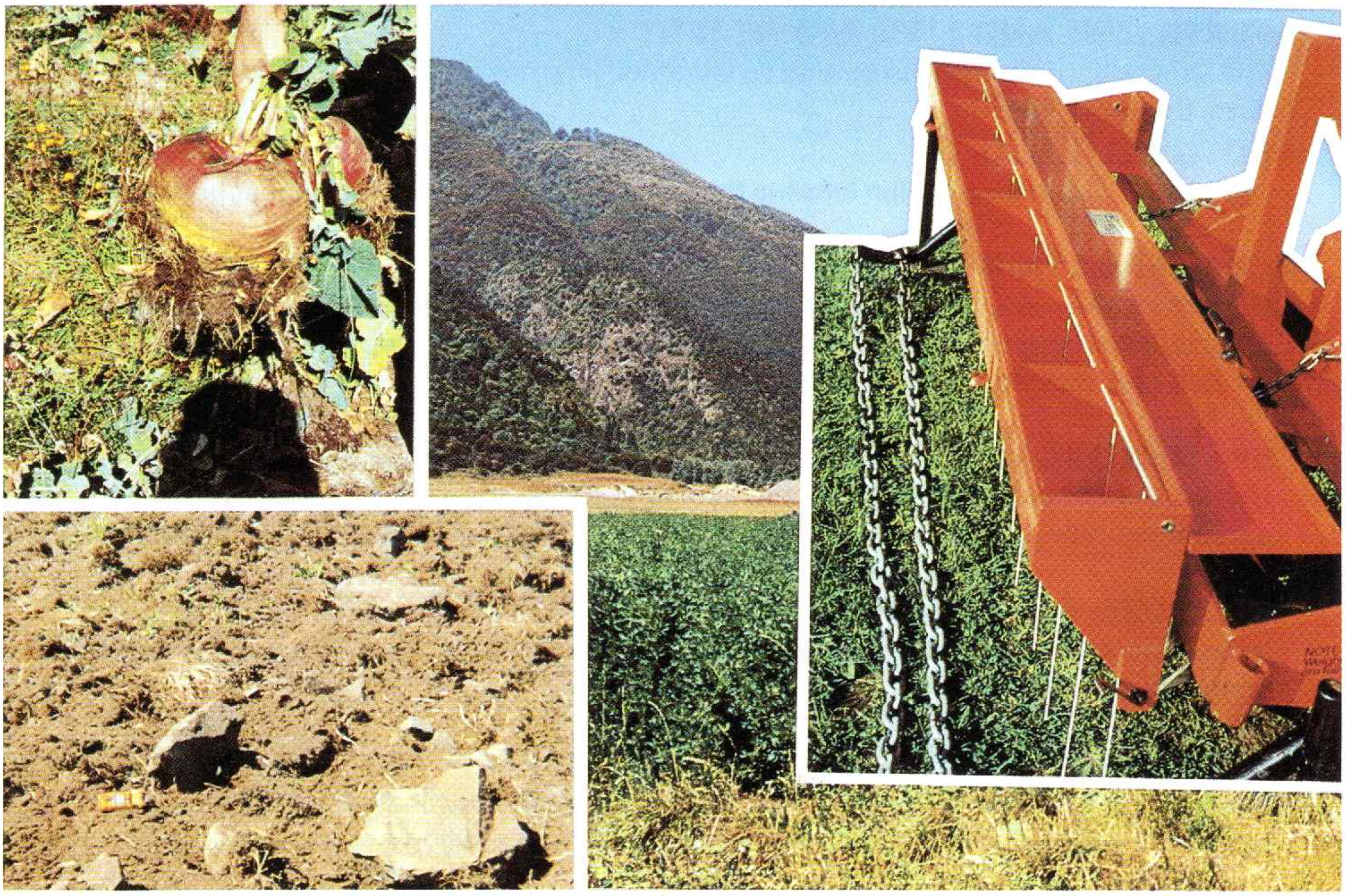
SOIL COMPONENTS



PLANT COMPOSITION

Oxygen	45	
Carbon	44	95%
Hydrogen	6	
Nitrogen	2	
Potassium	1.1	
Calcium	0.6	
Sulphur	0.5	
Phosphorus	0.4	
Magnesium	0.3	
Manganese	0.05	
Iron	0.02	
Zinc	0.01	
Boron	0.005	
Copper	0.001	
Molybdenum	0.0001	

GROUNDHOG SEEDBOX
for 'One Operation' Pasture Renovation



After ploughing, this rocky ground was transformed to productive lucerne with the use of only two implements, a **GROUNDHOG** and a **GROUNDHOG SEEDBOX.**

The **SEEDBOX** bolts direct to the Groundhog. Sowing rates can be altered quickly by a turn of the handle. Handles general rye grass mixtures, swedes, turnips or lucerne seed. °*Not recommended for Prairie Grass.*

Note: This is not a precision sowing machine and does not bury the seed.

OF HIGH QUALITY FARM EQUIPMENT

APPLICATIONS

AERATION
For pasture, grasslands, general field crops, commercial vegetable production and turfgrass, the Groundhog provides a full 7" of penetration enhancing air and water penetration resulting in increased biological activity for healthy root development and greater yield.

COMPACTION RELIEF
Use of the Groundhog will relieve natural or machine-made compaction and hard-pan layers for its full depth. This will encourage a deeper, stronger root system while permitting sub-soil moisture to rise during droughts by natural capillary action.

FERTILIZER AND LIME MOVEMENT
The Groundhog will assist in getting fertilizer and lime down to the root system where it does the most good.

ROTOVATION
The unique Groundhog design loosens the soil without destroying granular aggregation.

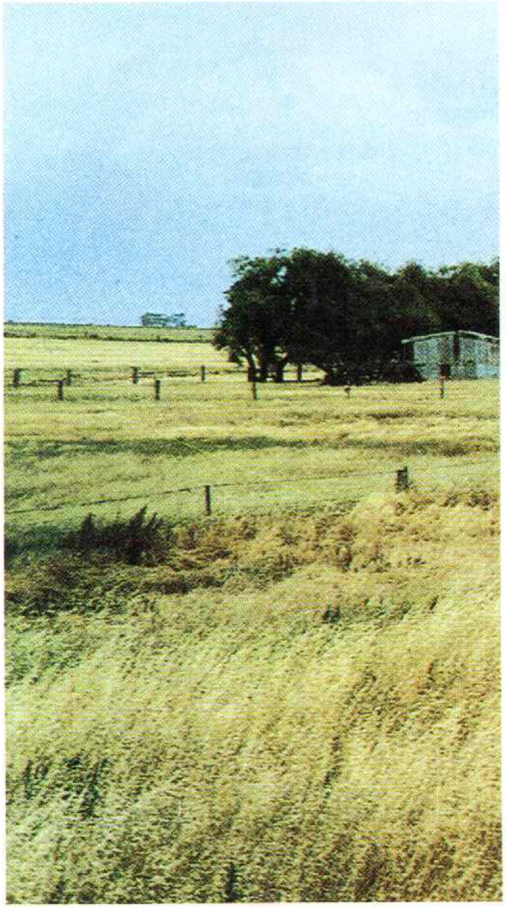
CONSERVATION TILLAGE
With the ability to offset the rollers, the Groundhog will leave stubble on top of the ground to decay without destroying the soil structure. A spring pass will incorporate the residue and provide a seed bed in a single step.

WATERLOGGED SOIL RELIEF
Use of the Groundhog will open the soil to increase the moisture evaporation and percolation rate and allow water-logged areas to become productive again, sooner.

SEED BED PREPARATION
In one operation, the Groundhog loosens the soil and rolls it, creating ground which is ready for seeding.

EROSION CONTROL
Because the Groundhog does not destroy soil consolidation, and leaves the residue on top of the ground, the conditions which promote soil erosion are avoided.

RENOVATION
Use of the Groundhog opens the soil providing better root development and increased pasture life. With the optional seed box attachment, overseeding can be accomplished simultaneously.



The property on the right has used a Groundhog for 6 months to improve the pasture from the adjoining property, pictured on the left.

SIMPSON VICTORIA, AUSTRALIA.

AUTHORISED DEALER

Manufactured and marketed by:

ALLEN YOUNG MOTOR & ENGINEERING LTD.

Phone: (07) 348-9563. 77 PURURU STREET, ROTORUA. Fax: (07) 348-5943.

ALLEN YOUNG MOTOR & ENGINEERING LTD.

Manufacturers and Marketers of Groundhog Farm Implements Worldwide
Chassis Straightening and Josam Laser Wheel Alignment Service

GROUNDHOG
EVEN-SOW
FLOWMATIC

77 PURURU STREET, ROTORUA

PHONE: (07) 348-9563 P.O. BOX 1066 FAX: (07) 348-5943

GROUNDHOG PRICE LIST FROM JUNE 1998

All prices exclude GST No Freight in prices

HORTICULTURE RANGE (* indicates no other roller option available)

* Lawn Model, 3pt linkage unit	4" roller	(12 to 18hp)	$1,565.00
* Lawn Model, Drawbar unit	4" roller		1,950.00
ATV Groundhog with Bolt on Blades			2,400.00
* 1.4 metre Standard	4" roller	(20 to 30hp)	3,085.00
1.8 metre Standard	4" roller	(30 to 40hp)	3,645.00
1.8 metre Standard	4" HD roller		3,975.00
(6" roller option available in 1.8 metre range)			3,945.00

DAIRY & SHEEP FARM RANGE

2.3 metre Standard	4" roller HD Blades		4,300.00
Pasture Renovator on Std Frame with Std Chamfer Blades			4,080.00
Pasture Renovator on Std Frame with HD Chamfer Blades			4,450.00
(Pasture Renovator has 6" Heavy Duty Rollers)		(40 to 55hp)	
2.3 metre Quickset Bolt on Blades		(60 to 80hp)	7,730.00
3 metre Standard	4" roller HD Blades	(60hp)	5,500.00
3 metre Quickset Bolt on Blades		(80 to 90hp)	8,960.00
3.6 metre Standard Hydraulic Folding		(80 to 100hp)	6,520.00
4.7 metre Hydraulic Folding		(90 to 120hp)	10,640.00
7 metre Hydraulic Folding		(120 to 150hp)	14,225.00

(GROUNDHOGs can be made for special purposes if requested)

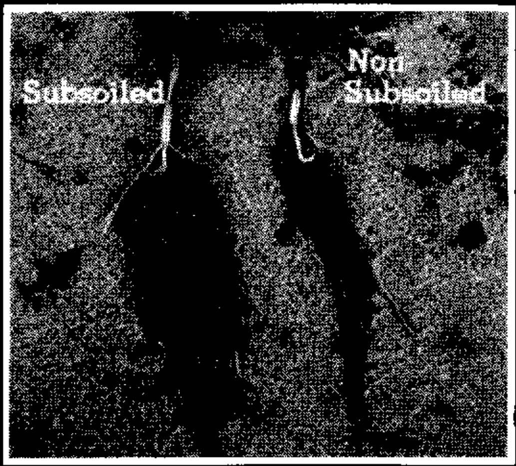
GROUNDHOG SEEDBOXES

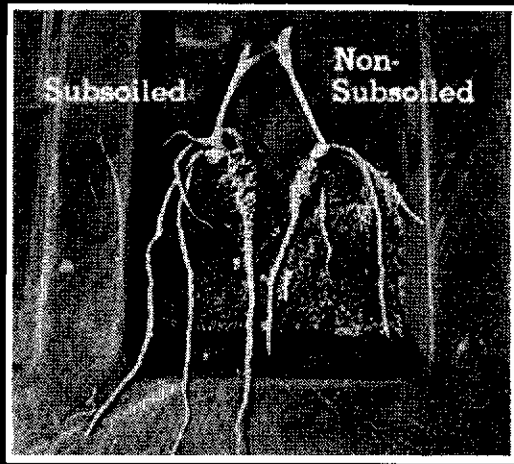
Lawn Model		$ 410.00
1.4 metre	(4'6")	550.00
1.8 metre	(6')	965.00
2.3 metre	(7'6")	980.00
3 metre	(10')	1,420.00

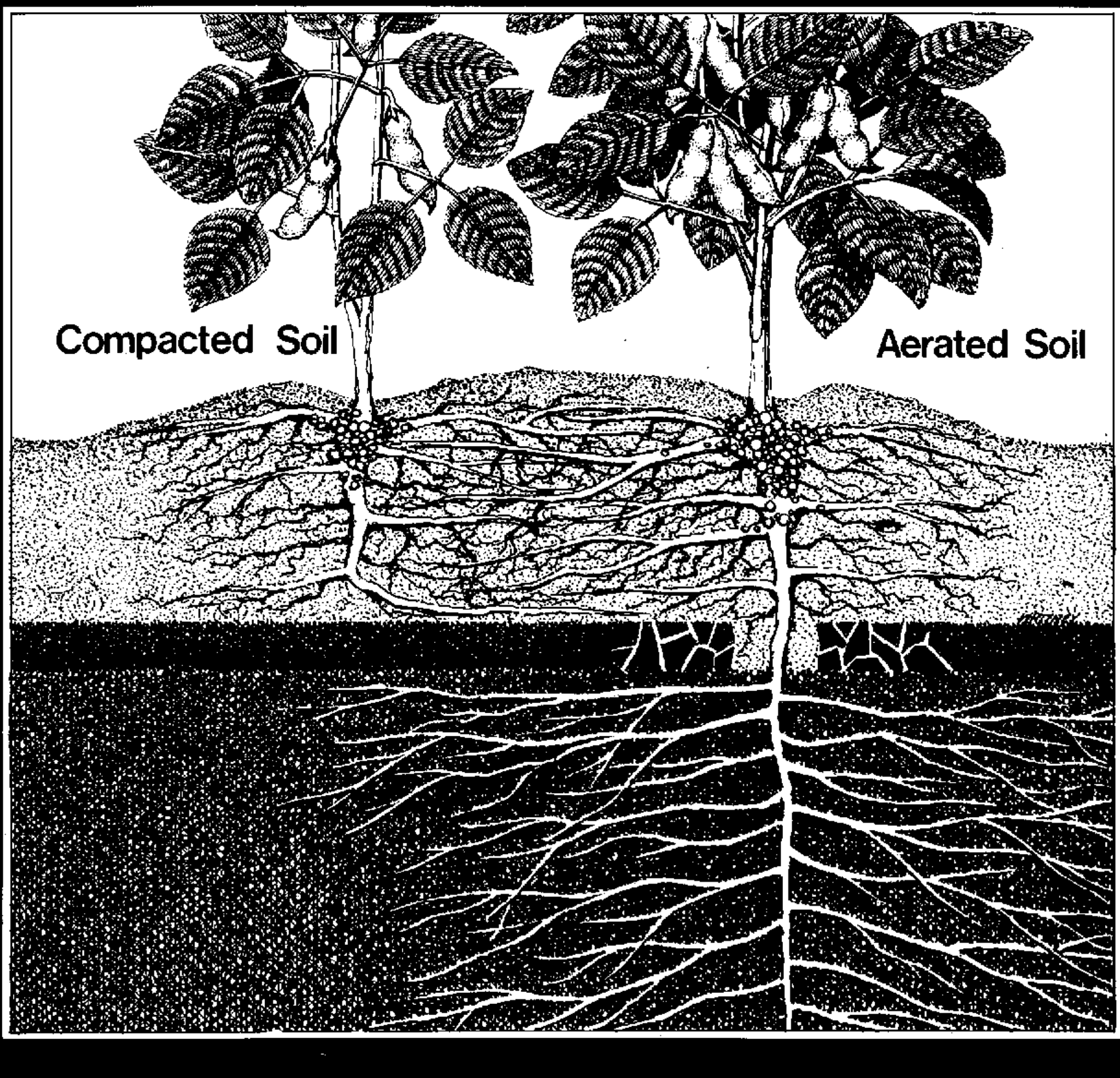
THERE IS A GROUNDHOG TO SUIT EVERY KNOWN FARMING SITUATION IN N.Z.

Root Development in Compacted and Aerated Soils

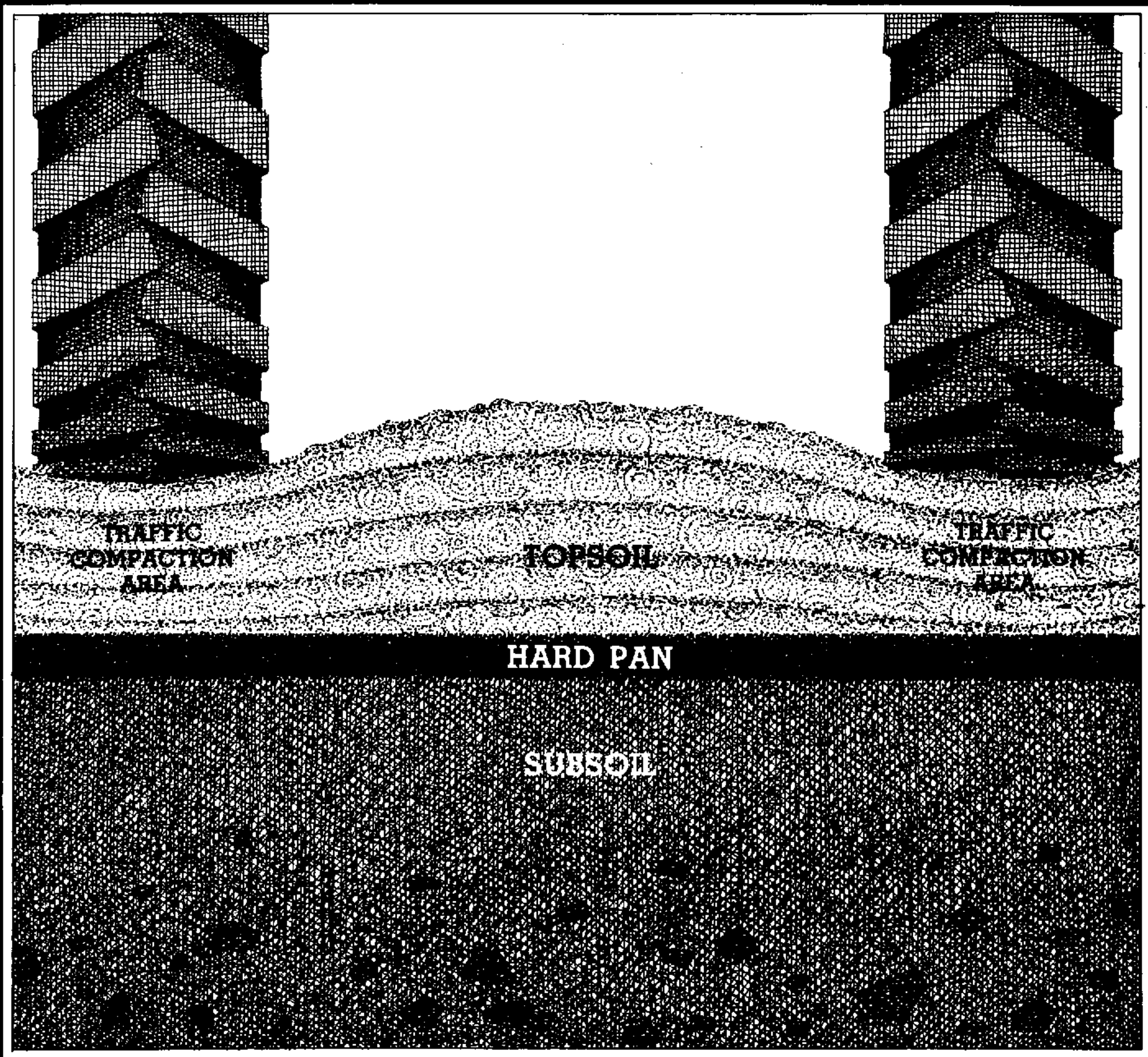
Root Structure Aerated and Non-Aerated





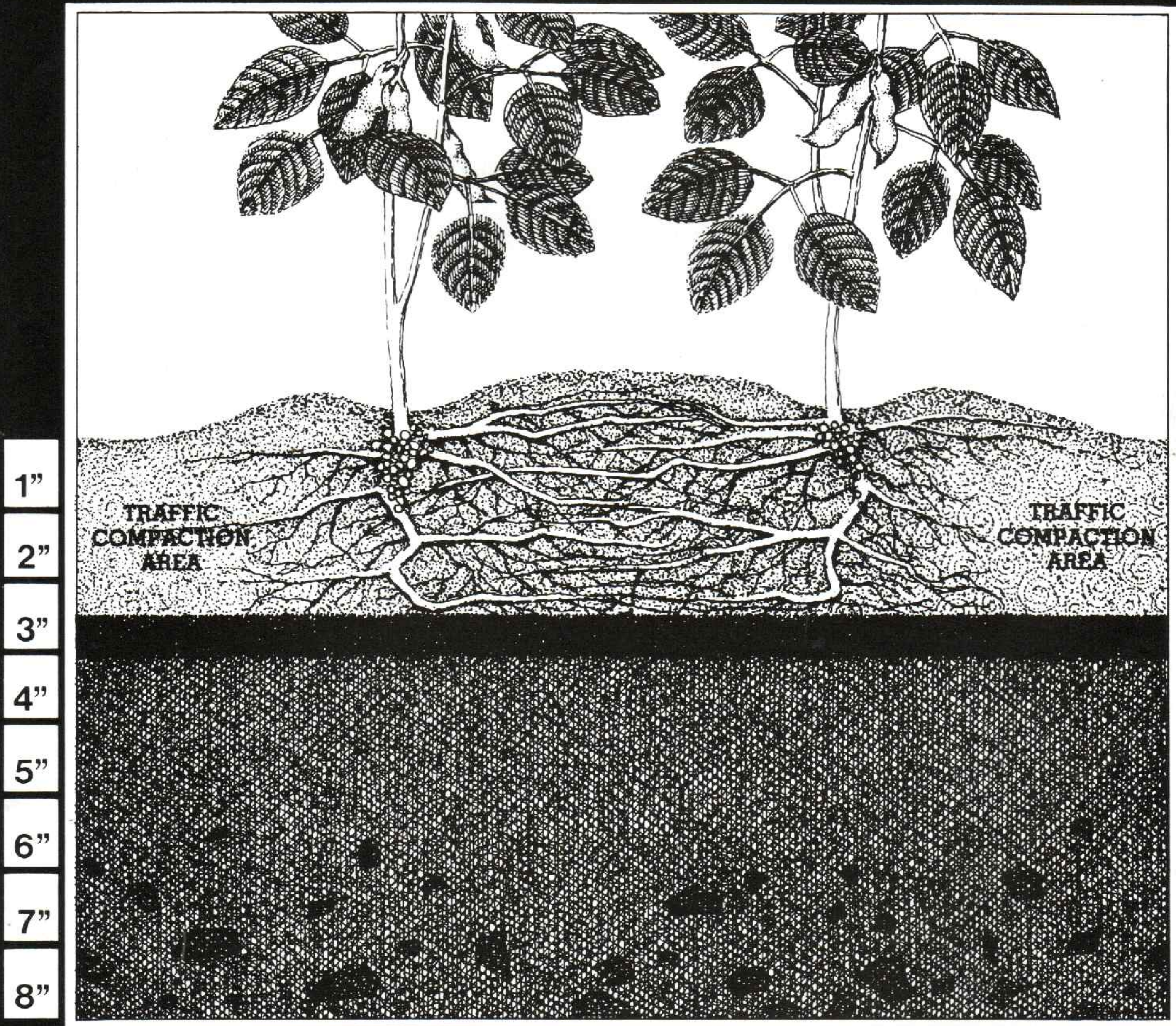


COMPACTION



The above illustration graphically depicts the problem of soil compaction which is the result of heavy traffic over a period of years. Traffic compacts the top soil forming hard pans beneath the surface. Water is unable to seep through the hard pan and instead drains down the compacted tire lanes, carrying away valuable top soil and chemicals.

ROOT STRUCTURE



Here you see a shallow root structure confined by the compacted area and hard pan. The root system is deprived of some of its natural soil environment and has access to only the moisture above the hard pan and between compacted areas. Compacted soil lacks the necessary air and moisture for effective material decomposition. This can leave your soil deficient and pastures drought prone. Compacted soils are caused by ever increased stocking rates and you, as a farmer, must take remedial action or suffer the consequences.

Soil Study Vital

Editor's Note: Happenings from the Station is prepared by Dr E. Broadus Browne, resident director of the Coastal Plain Experiment Station in Tifton.

Some of the most fascinating and unusual research being done at the Station has to do with soil management.

It is not just soil management, but management of water and other soil inputs used in crop production. You would think after all the years of scientific research on soil — sometimes erroneously called dirt — we would know about all there is to know about it.

When you go out to a bare field and look at the soil it just seems to lie there not doing very much. If you are looking at a good productive, agricultural soil nothing could be farther from the truth.

Soil is actually a dynamic, living system, with an awful lot going on in it. We do know a good bit about what makes a soil tick — so to speak — but there is still much we don't know. Then, too, I suspect some of what we think we know is wrong.

One of the difficulties is that it is almost impossible to study soil without destroying some of its vital features. You can separate and measure its parts and analyze them chemically, but with the soil the whole is much more than the sum of its parts. The way the constituents are put together is more important than many of us have fully appreciated.

One of the things we are finding out about our coarse textured coastal plain soil is the less you work it the better. A lot of the plowing, disking and harrowing we have traditionally done in growing a crop has been unnecessary, if not down right harmful. The critical item seems to be compaction.

The more you run a wheeled tractor over a field the more compaction you get. You wouldn't think it would make such a difference on sandy soils as it does.

Dr Doyle Smittle has been studying this soil compaction business with vegetable crops and has obtained very striking results. He says the results are so good he hardly believes them himself.

It appears that root penetration and distribution in the soil layer is very sensitive to soil compaction in many crops. Tests with squash have shown yield differences between non-compacted and compacted soil as great as 2.5 times. With slicing cucumbers the difference has been two times.

The compacted treatment was the result of the usual method of soil preparation for crops involved. The non-compacted was accomplished by avoiding several operations and measuring yields in between where the tractor sheels had run.

It would appear that a once-over plow-plant system would approach the ideal management system under the conditions of the experiments. Such a system not only would provide a desirable medium for root growth, but also could result in substantial savings — saving energy and operating costs.

Perhaps the American Indian knew more than we thought when he first saw a plowed field. His comment was, "land upside down!".