Special report:

GRASS: The stockman's crop How to harvest more of it

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Yes, grass is a crop — a crop that rivals corn, wheat, and soybeans in importance. It's the backbone of our livestock industry, and also important to wildlife, watersheds, and recreation. In this report you'll learn the basics about grass and ways to manage it for desired production.

Do you take your grass for granted?

Almost everybody takes their grass for granted—and has for a couple of centuries.

Few of our early-day stockmen had enough time to look closely at their grass and think about its needs. The demands of pioneer life assigned their grass "crop" a low priority. The apparent endless growing energy of their grass gave these founding cowmen a false sense of security.

Not enough of our pioneer stockmen realized then—or for that matter, even today—that grass needs more than Nature's allotment of rainfall in order to produce a bumper crop for livestock, our four-legged harvesting machines.

It's been difficult for a society oriented toward cultivation to accept that management and the manipulation of foraging animals is the basic key to production.

Manage your grass

Experience with planted crops has naturally led many cattlemen to search for solutions to rangeland problems in the realm of fertilizers, mechanical equipment, and the like. The idea that grassland production could be increased via practical grazing management has, thank goodness, gained acceptance over the years.

But, the application of needed management has unfortunately lagged. Since the last ice age melted on its retreat Northward, the vegetation of North America has had several thousand years to adapt to a multitude of local climatic and soil conditions.

By the time European settlers turned out their cattle in the USA and Canada the most adapted grasses were already in place and flourishing.

These grasses had developed through "survival of the fittest" and were in tune with their environments. They were adapted to grazing and could survive drought, flood, fire, insects, and diseases. Millions of wild animals, from bison to elk, were supported by this grass.

When they were largely replaced by cattle and sheep the conversion was rapid and simple. We got off easy. Because, in some parts of the world the native vegetation often had to be completely replaced before a livestock industry could prosper. Fencing of grasslands became widespread following the invention of barbed wire. This, however, was a two-edged sword.

Stockmen could then control the grazing of their cattle, and so better manage their grass efficiently. But, fences also established confines that permitted mismanagement that often led to deterioration of the native pasture.

Fences plus water developments were even more damaging to grassland, because this allowed the stockman to continue to graze during the drought conditions where under natural conditions the grazing animals either left or died when the water dried up.

The result: Due to either a lack of understanding or a low priority given to grass management, many ranges degenerated far below their pre-cattleman conditions.

What a resource!

There's a silver lining, though. Grass is a renewable resource. It'll respond to a combination of management techniques so you can restore much of its original lost production.

The importance of grass management can't be overstressed. Many cattlemen have spent nearly their entire lifetimes in livestock breeding and culling programs to increase herd production 20 to 30 percent. They then also found they were able to increase stocking rates 30 to 100 percent through sound grazing management

Your efforts to restore grass production need to begin with a solid grounding in the fundamentals of grass growth.

There's a natural tendency to search for exotic and often expensive methods of improving grasslands.

However, any innovation or practice that doesn't allow for the basic functions of grass growth to occur is incomplete.

Once you understand the basics, then you can apply the innovations toward your goal of measurable improvement.

Is cornerstone crop

Have you ever thought about just how important grass is? In most states West of the Mississippi and in a few to the East, grass is the foundation of the leading source of income: The sale of livestock.

But, in addition to production of meat, milk, and wool, grasslands provide other amenities important to us all.

Grasslands form vast watersheds that yield quality water for urban use. They're also important for production of wildlife. And, they're becoming recognized as sources of recreation and aesthetics.

There are more than 1,000 species of grass in the USA alone. And, in any given locality this number may vary from 100 to 200.

As a general rule, eight to ten of these species produce 70 to 90 percent of a locality's forage.

What's what in grass "anatomy"

Grasses, like people in crowds, look alike to the casual observer. But, also like people, grass plants have characteristics that set them apart as individuals or species. So, if you can tell different breeds of livestock apart, you can also easily learn to tell one kind of grass from another.

Want specific information? There are numerous manuals available for all areas of the country that'll help you identify your grasses. You can ask your Soil Conservation Service or Extension Service people for information and assistance, too.

If you're used to identifying garden plants by their color, odor, and shape of flower, identifying grasses may be slightly difficult for you at first.

Why? Because, grasses have no non-essential parts. Being wind-pollinated, their flowers need no bright colors, fragrances, or nectar to attract insects helpful in pollination.

How to ID grasses

So, to identify grasses you instead need to look closely for differences such as height, shape of leaves, stems, hairiness, and seed heads.

The above-ground parts of a grass plant are divided into two parts: Vegetative and flowering.

The flowering parts are referred to as the inflorescence, and include seeds and their appendages.

The vegetative parts include leaves and stems that are usually round or somewhat flattened. Stems are generally hollow, although they're occasionally filled with a soft pith much like that of corn or sorghum plant stems.

Grass stems are jointed. Usually they're swollen at the joint or node. A leaf originates at each node, and leaves alternate on opposite sides of the stem.

Joints are short and compressed, giving rise to a cluster of leaves at the base of the plant. Joints and leaves tend to be further apart as they progress up the stem.

Grass leaves have two main parts, the blade and the sheath. The sheath clasps tightly around the stem, elevating the blade. The blade is the portion that extends away from the stem.

A small membrane-like projection, the ligule, extends from the sheath. Sometimes called a rainguard, the ligule provides a small barrier at the base of the blade to keep dirt and rain from fouling the sheath.

The reproductive part, the inflorescence, is made up of many smaller units or spikelets. Spikelets are composed of florets or grass flowers.

The number of florets in a single spikelet may range from one, as in switchgrass, to 30 or more in some lovegrasses. At maturity the florets produce seed. Each seed is enclosed by two small leaf-like bracts known as the lemma and the palea.

In many grasses these bracts have a prolonged sharp extension called an awn. These awns cling to the hair of livestock and clothing, giving the seeds some mobility.

A few grasses have awns that are detrimental to livestock, though, because they can cause mouth ulcerations and eye irritations.

Each of these appendages—leaves, stems, and flowering parts—has a function. Generally each differs somewhat from grass species to grass species. These are the differences you can learn to use to identify the different grasses.

See only half

More than half of a grass plant's total volume is out of your sight underground in the form of roots and underground stems.

The main functions of the roots are to anchor the plant to the soil and to absorb water and minerals. Perennial grass roots also serve as storage areas for plant food.

Underground stems or rhizomes are present in many grasses. They provide a vegetative method of reproduction as an alternative to seeds. These rhizomes sprout laterally from the parent plant to form new plants. They also store some plant food.

How to classify grasses

You can divide grasses and sort them into various "pigeonholes" in any of several ways.

First, you can sort them according to the season in which they make their major growth. Some grasses, for example, begin their growth early in the Spring when the soil temperature reaches 40 to 45 degrees F.

They complete their cycle dur-

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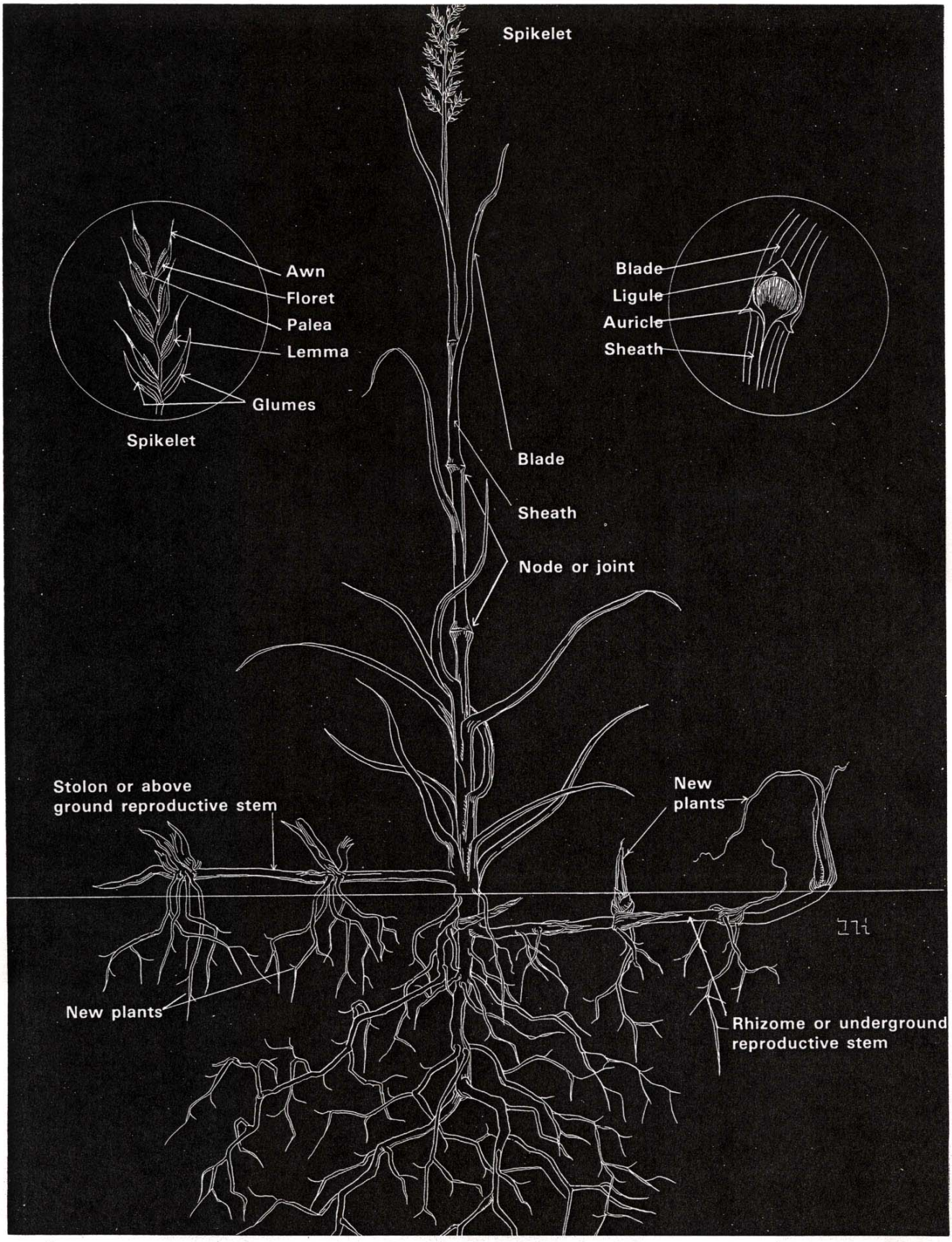
Spikelet
Awn
Floret
Palea
Lemma
Glumes
Spikelet
Blade
Ligule
Auricle
Sheath
Blade
Sheath
Node or joint
Stolon or above ground reproductive stem
New plants
New plants
Rhizome or underground reproductive stem

Grass [Continued]

ing the cooler months before hot Summer weather sets in. And, they're usually partially dormant during the Summer months. So, they're called, naturally enough, cool season grasses.

These grasses are important in extending the period of green forage while the warm season grasses are dormant. They're valuable sources of protein and vitamin A during late Fall and early Winter and again in late Winter and early Spring.

Some cool season grasses are the wheatgrasses, bluegrasses, fescues, bromes, wheat, barley, and other small grains.

The second main group of grasses is the warm season grasses. They begin their surge of growth when the soil warms to 60 to 65 degrees F. These plants are adapted to higher temperatures, and can endure Summer heat. They complete their growth cycle in late Summer or early Fall.

Warm season grasses occupy much of our rangeland acreage, especially in the Great Plains area. These grasses include the gramas, bluestems, dropseeds, lovegrasses, Buffalograss, and Indiangrass.

Some "come back"

Longevity is another way you can divide grasses. Some grasses are perennials that remain alive for several years. These plants begin new growth each Spring from crowns and roots near the surface of the ground that have remained alive, but dormant over Winter. They grow and complete their cycles during favorable temperature periods, and then again go into dormancy to endure unfavorable Winter weather.

Grow from seed

Other grasses are annuals. Beginning from seeds every year, they produce roots, stems, leaves, and finally seeds, then die the same season.

However, there are some Winter annuals that begin growth from seeds in the Fall, go semi-dormant during the Winter, and then terminate their growth, after producing seed, the following Spring.

Grass height varies

You can further classify grasses according to their growth statures: Tall, mid, and short.

Tall grasses grow four to eight feet high. These grasses are usually abundant in higher rainfall areas East of the 98th meridian and on favorable sites along streams and moist valleys in the Western plains and mountains.

Our major tall grasses include Big Bluestem, Indiangrass, Switchgrass, Eastern Gamagrass, Prairie Cordgrass, and Giant Sandreed in the Central and Eastern plains and areas Eastward of the Mississippi River.

Sacaton, Switchgrass, and Giant Dropseed are our major tall grasses in the Southwest. Giant Wildrye, Basin Wildrye, Tall Oatgrass, and Common Reed grow in the Northwest and intermountain regions.

Mid grasses are intermediate in growth height. They vary from two to four feet in height. This is a large group of grasses that you can find over a wide portion of the Central and Western range areas of the USA and Canada.

Included in this group are Little Bluestem, Sideoats Grama, wheatgrasses, needlegrasses. wild ryes, Smooth Bromegrass, fescues, dropseeds, and Alkali Sacaton.

These form a mat

Short grasses are generally grasses that grow less than 18 inches in height. They're low-growing, and usually form a mat that covers the soil surface.

In addition to being valuable grasses for grazing in the more arid Western portions of the USA, you'll also recognize them in lawns, parks, and golf courses.

Included in this group are Buffalograss, Blue Grama, Kentucky Bluegrass, Bermudagrass, Bahiagrass, Zoysia, Curly Mesquite, and Bentgrass.

No energy shortage here

Grass manufactures its own food in its leaves and stems. No, the old belief that food is drawn from the soil is contrary to what actually happens.

Science with all its startling discoveries and innovations still remains humble and awed by the ability of plant leaves to capture radiant energy from the sun and convert it into chemical energy.

This is the beginning of food—energy chain that nourishes all life. No other single chemical reaction is as important to our existence as this conversion process called photosynthesis.

Reaction is vital

How's it work? The plant draws water from the soil through its roots and transports it to its leaf cells. Carbon dioxide is pulled from the air through tiny pores on the lower side of the leaves.

There, in the leaves, green chlorophyll captures the power of sunlight. The leaves of the plants are in a sense the solar panels collecting the sun's energy to run the plant food factory. More leaves mean more solar "collectors" which in turn means more production. A series of chemical reactions takes place combining carbon, hydrogen, and oxygen into a simple sugar.

This basic source of chemical energy is then combined with other elements to form protein,

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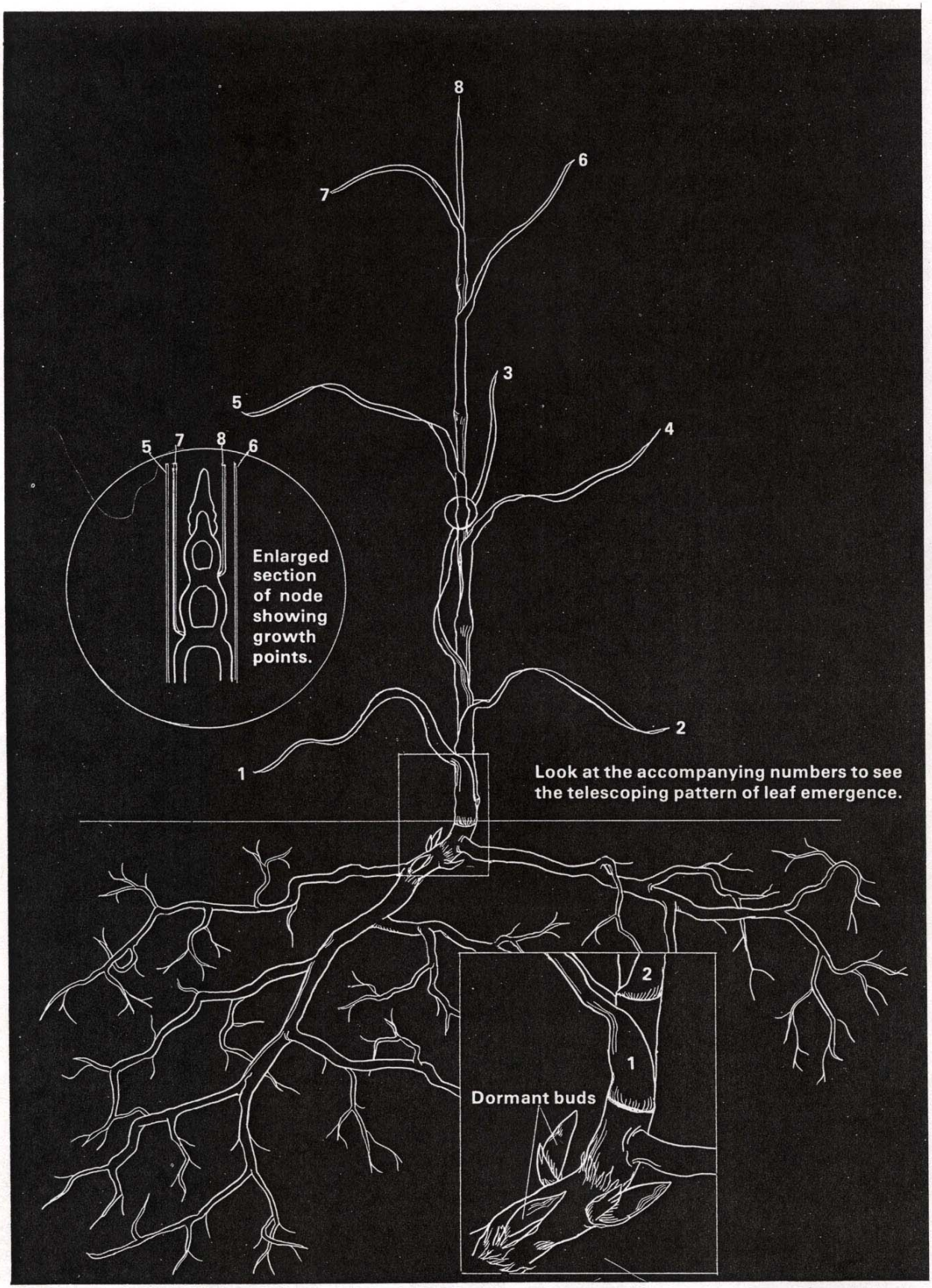
8
7
6
5
3
4
2
1
5 7 8 6
Enlarged section of node showing growth points.
Look at the accompanying numbers to see the telescoping pattern of leaf emergence.
2
1
Dormant buds