

Early Development Range (

by Dwight R. Cable*

Just as "tall oaks from little acorns grow" so on a smaller scale do our range grasses develop from small beginnings. In fact, the seed-producing process in a grass begins with microscopic changes in the growing point of the grass, at the upper end of the shoot. At this time in the life cycle of the grass plant (usually toward the latter part of the summer rainy season) the growing point stops initiating new leaves (vegetative organs), and begins initiating reproductive organs — the inflorescence or seed head.

The fully developed inflorescence consists of the individual flowers, or florets, enclosed in bracts (specialized leaves) and arranged variously, depending on the species, along the branches of the inflorescence.

At the time it changes from a vegetative to a reproductive condition, the growing point is a smooth, rounded knob at the apex of the shoot, probably less than 1/200-inch long. After a short period of elongation, the reproductive growing point develops swellings and protuberances, which additional swellings and protuberances are produced. Each such successive level of differentiation represents a more specialized level of structure, from inflorescence branch, to glumes, to floret component initials.

By the time the newly developing inflorescences are 1/10- to 1/16-inch long, for the four range grasses shown in Figures 1A, 2A, 3A, and 4A, rudimentary glumes are apparent, and the floret initials are about to appear. From this time on the inflorescence develops primarily by elongation, enlargement, and refinement in structural detail.

The fully mature inflorescences of the grasses (Figs. 1B, 2B, 3B, and 4B) vary from 1.5 to 5.5 inches long — from 14 to 25 times longer than in the immature stage (the "A" series):

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Figure 1. Tanglehead (*Heteropogon contortus*). A. (left) Immature inflorescence enclosed by 6 leaves, showing terminal raceme and axillary racemes; B. (right) Mature inflorescences, showing twisted awns.

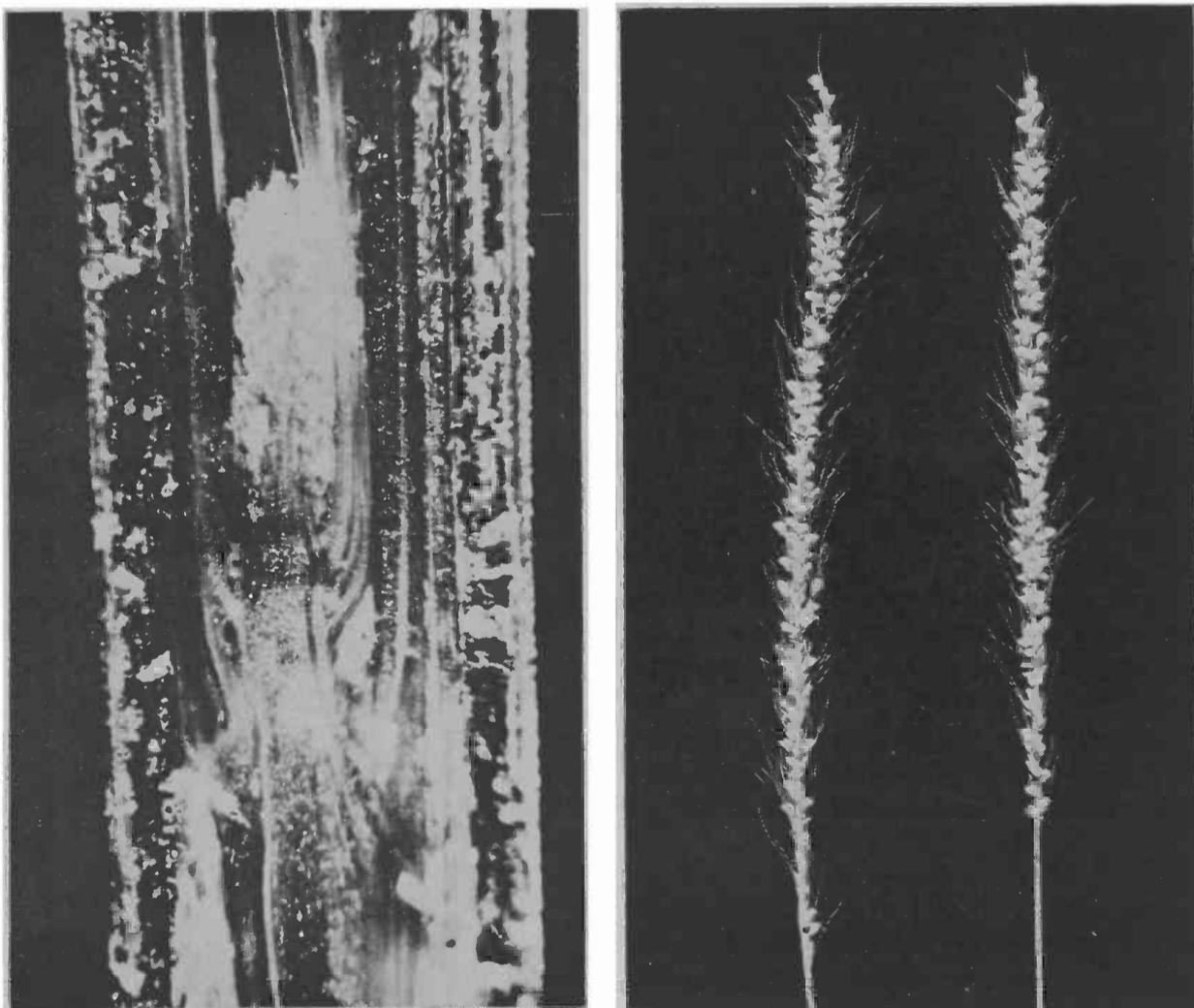


Figure 2. Plains bristlegrass (*Setaria macrostachya*). A. Immature inflorescence enclosed by 6 leaves, showing a single small axillary inflorescence; B. Mature inflorescences.

of ss Inflorescence

ure	Species	Inflorescence Length	
		Immature (inches)	Mature (inches)
Tanglehead11	1.5-2.0
Plains bristlegrass08	4 -4.5
Arizona cotton top06	5 -5.5
Cane bluestem06	2.5-3.5

As the inflorescence develops and elongates, the shoot below the inflorescence also elongates. For example, Fig. 1A shows about 1/5-inch of shoot length below the tanglehead inflorescence, and six leaves are attached along this short section of shoot. All developing axillary racemes (branch inflorescences) can be seen in the axils of four of these leaves. As these racemes and the shoot mature, the internodes between the points of attachment of the leaves elongate, so that the 1/5-inch shown in the figure eventually reaches about 18 inches in length. The internodes of the other species elongate similarly as the inflorescences develop.

One small developing axillary panicle is evident in Fig. 2A (plains bristlegrass) on the right side below the terminal panicle. Tanglehead and cane bluestem also produce axillary shoots, but in these species they do not develop until the terminal inflorescence is fully developed and internode elongation is well under way.

Production of axillary shoots and inflorescences is quite variable, depending on the species and on moisture conditions. In a wet summer, many axillary shoots may be produced (up to 15 or more on a single tanglehead main shoot), but in a dry summer such as 1973, only the terminal inflorescence may appear.

These growth patterns illustrate one of the hazards of grazing during the growing season. A single bite by a hungry cow, rabbit, or grasshopper (maybe two bites), when the grasses are in the early reproductive stage of development, can not only destroy the developing seed head but also prevent the development of a foot or so of shoot with its associated leaves. Forage and seed production can be severely reduced by heavy use at the wrong time. On the other hand, if grasses are allowed to make substantial growth before they are grazed, fewer stems are needed to supply a cow's daily needs.

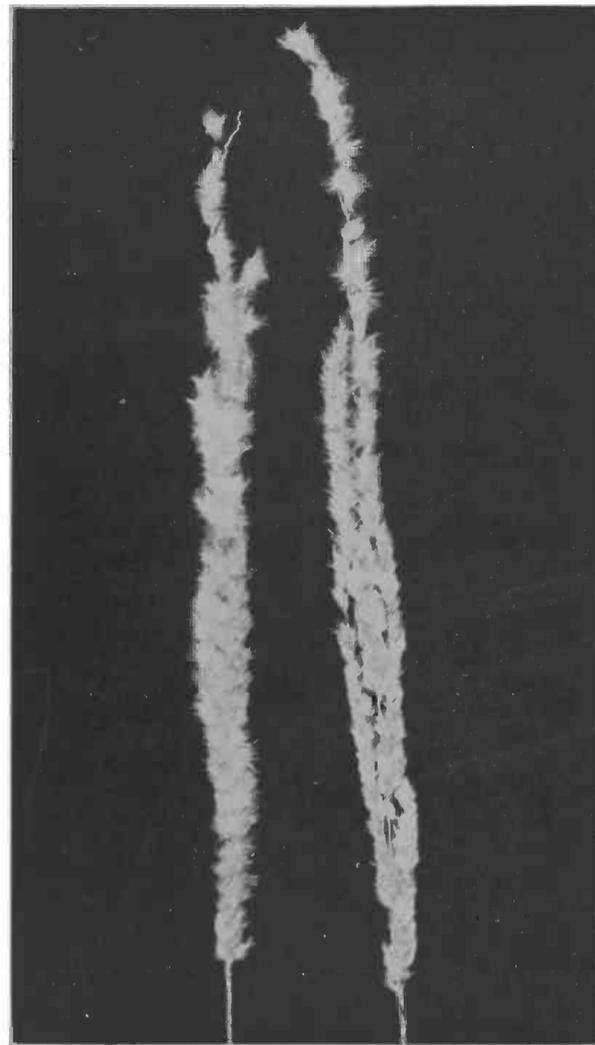
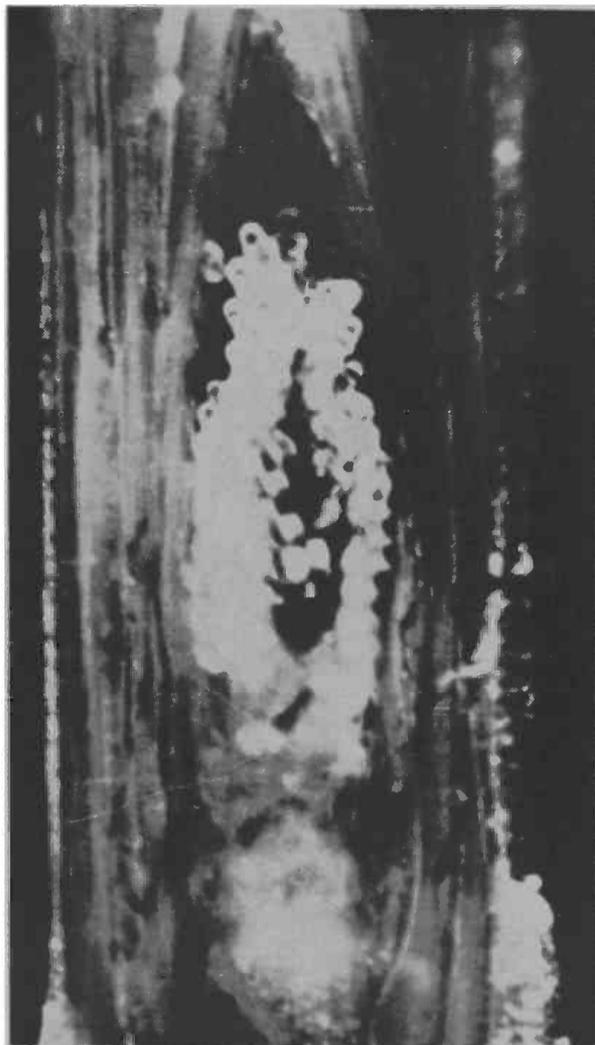


Figure 3. Arizona Cottontop (*Trichachne californica*). A. Immature inflorescence enclosed by 4 leaves; B. Mature inflorescence showing white cottony pubescence.

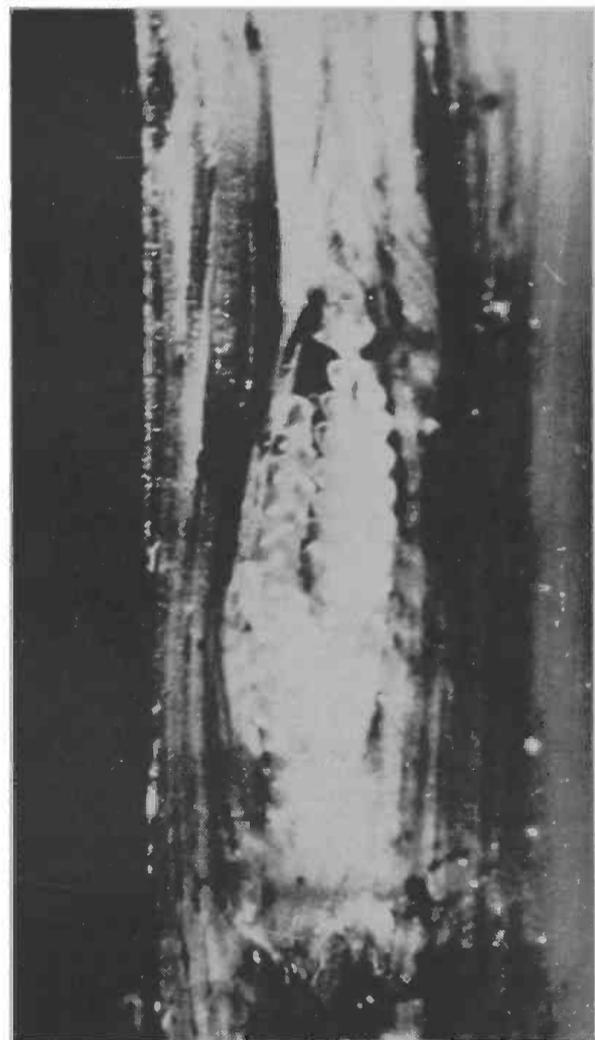


Figure 4. Cane bluestem (*Andropogon barbinodis*). A. Immature inflorescence enclosed by 5 leaves; B. Mature inflorescence showing long white silky pubescence.