

Root Development Of Blue Panicgrass

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The root systems of perennial grasses have received less attention than the aboveground parts, for obvious reasons. Tops are exposed and form an easily available source of material for study.

The aim of the grass breeder is to develop varieties capable of sustained yields. To help achieve this, good management practices are of primary importance in evaluating the yield potential of genotypes. Therefore, information on root distribution and the effects of cultural practices on root responses are important in the interpretation of management data.

Roots Have Many Jobs

In general, the root system of blue panicgrass performs the functions of absorption, conduction, anchorage and storage and serves as asexual reproductive structures. Perhaps the most important function of roots is absorption of water and nutrients. Once these plant foods are absorbed from the soil, the root conducts the materials to the stem. Thus water and nutrients can be distributed throughout the plant.

Anchorage is a mechanical function of roots, which support the stem by anchoring it to the soil. Roots and rhizomes accumulate food reserves manufactured in the aboveground parts of the plant, which are carried to the roots and stored for future use. In addition blue panicgrass rhizomes are capable of developing adventitious buds, which give rise to leafy shoots. Rhizomes provide a means of propagation, which is a decided asset to the grass breeder because it permits vegetative increase of selected plants.

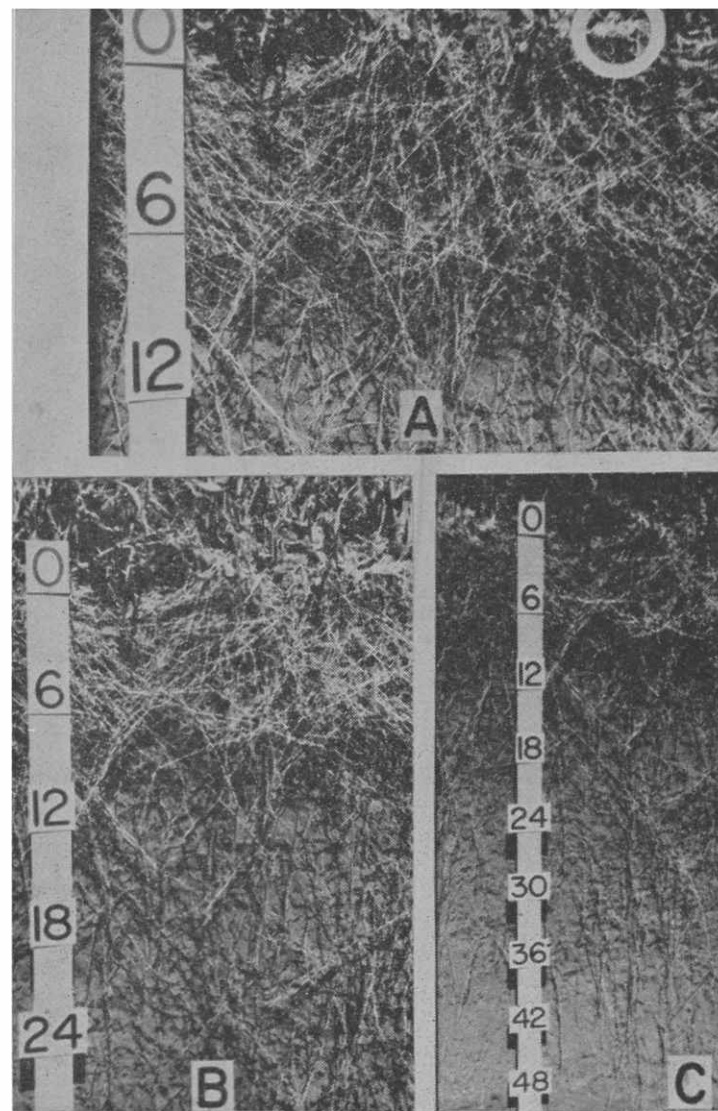
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Since the growth of a plant depends so much on its root system, a look into the rooting habits of a crop plant may help to determine management practices for sustained forage yields. For example, a knowledge of the depth of rooting and quantity of roots at various depths is important in determining irrigation schedules. When the effective rooting depth is known, the amount of water potentially available to growing plants can be more than an estimate. Also, the amount of irrigation water needed to recharge the soil can be predicted.

An Underground Profile

Root distribution of blue panicgrass under irrigated conditions has been studied to a depth of 12 feet. The pictures on this page show a profile of blue panicgrass roots and rhizomes to a depth of 48 inches. All the rhizomes of this grass are located near the surface, in the upper 6 inches, (A). The study showed approximately 70 percent of the roots in the top two feet, (B). The amount of roots between two and 12 feet decreased progressively and represented approximately 30 percent of the total. Under irrigation, where soil moisture is replaced as it is used, roots in the 0-to 2-foot zone, making up to 70 percent of the total, are of major importance to growth. Also, the depth of root penetration serves an important function when soil moisture is limited.

Blue panicgrass does not exhibit visible stress until the soil moisture in the upper two-foot root zone has been depleted to the wilting point. Then the 30 percent of roots in the lower depths provide moisture when the available moisture is reduced in the upper two feet, which demonstrates the capabilities of this grass when moisture stress cannot be avoided. However, for maximum forage production, sufficient available moisture must be maintained in the upper two-foot root zone.



ROOT DISTRIBUTION of a blue panicgrass profile; A—0 to 12 inches, in rhizomes shown in circle; B—0 to 24 inches, and C—0 to 48 inches.

Nitrogen Helped

The effects of fertilization, cutting height, and soil-moisture stress on blue panicgrass root weights in the upper two-foot zone have been investigated. The quantity of roots was increased by nitrogen fertilizer, while phosphorus and potash did not increase root weight. Root weights increased as cutting height was increased from 3 to 12 inches. Root weights decreased as soil moisture was reduced to the wilting point at depths of 6, 12, 18, and 24 inches.

These studies indicate that management practices do affect development of blue panicgrass roots. Application of nitrogen fertilizer, harvesting forage to leave 9 to 12 inches of stubble, and providing available moisture in the upper two-foot root zone will result in the best root development under irrigation.

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