AGRONOMIC CONDITIONS THAT CONTRIBUTE TO BROWN LEAF IN SUDANGRASS IN THE LOW DESERT

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ABSTRACT

Preliminary observations indicate that several situations can be related to brown leaf in sudangrass. Four of the issues observed that relate to the brown leaf disorder were irrigation and fertilizer problems, disease, insects, and nitrogen deficiency. The export market is now demanding a product with low nitrate at harvest. The difficulty encountered by growers is trying to grow a high tonnage crop with low nitrogen and still avoid brown leaf symptoms that discount the crop.

Key words: observations, sudangrass, brown leaf, nitrogen

INTRODUCTION

Sudangrass grown in the Imperial Valley is basically a "transition" crop. It is grown in the summer following winter vegetables to capture residual fertilizer and offset rent costs. It also follows wheat and early dug sugar beets later in the spring. Since 1990, acreage has ranged from a low of 42,000 in 1990 to a high of 87,562 in 1997. The majority of the crop is grown for the export market to Japan.

NATURE OF THE PROBLEM

This is a progress report on the investigation into the cause(s) of "brown leaf" in sudangrass after farmers indicated that they were being discounted as much as 50% off the selling price due to a "discoloration" of the leaves. Reports indicate that brown leaf can be caused by bacteria (*Pantoea spp*) and spread by bacterial contaminated desert flea beetles. Other terms that buyers were assigning to the disorder were red leaf, leaf stripe, and leaf blight. The major difficulty in the investigation was correlating the leaf discolorations found in the stack to the various types symptoms that we were observing in the field. Field observations indicate that several situations can contribute to leaf discolorations that may reduce quality and price.

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FIELD SYMPTOMS

Over 25 sudangrass fields and stacks were examined. Several field patterns emerged.

1. Water-fertilizer issues-Individual leaves near the apex of the plant appeared to have desiccated rapidly. Perhaps a stressed condition due to drought, fertilizer burn, or anoxia contributed to the problem.
2. Disease-Leaves showing symptoms of red and brown lesions or blotches.
3. Physiological or nutrient deficiency related-Leaves that turned yellow from the tips with the yellowing advancing down the leaf to the stalk of the sudangrass. The yellowing was followed by necrosis of the leaf with the entire leaf eventually turning brown in some cases.
4. Desert Flea Beetle-High flea beetle populations were observed causing excessive feeding injury to the leaves. The leaves were injured to the extent that nutrients could not move to leaf tips. Desiccation and necrosis of the leaf tip and blade was observed as a result of the feeding injury.

OBSERVATIONS

We did not observe a high incidence of water-fertilizer issues to make a good correlation with the discoloration in the stacks (#1). Where leaf blotch and lesions were observed to be high (more than 50% of the leaves infected in several fields), a correlation of field symptoms and stack discoloration could be identified (#2). The most conclusive observations were those involving yellowing of the middle and lower canopy leaves followed by leaves turning brown. Many of the fields observed showed this kind of symptom in a high enough incidence as to be called brown leaf in the stack (#3). Several fields were observed with slow growing areas that were heavily infested with desert flea beetles. The injury observed could be correlated with discoloration in the stack (#4). Many of the fields observed showed all of the symptoms described above in some degree or another with the leaf yellowing and necrosis the most prominent symptom.

DISCUSSION

Farmers are attempting to grow sudangrass with less nitrogen fertilizer to meet the demands of the Japanese export market, which calls for a product with less than 1000 ppm of nitrate. In the approach to growing sudangrass with less nitrogen, growers are faced with the brown leaf issue. Observations to date indicate that fields with adequate nitrogen (not visually yellow) have fewer leaves in the lower canopy turning yellow and dying. This was first noticed where sudangrass followed produce in the second cutting. Areas in fields where the fertilizer was not utilized or was not applied evenly to the produce crop showed less brown leaf than sudangrass just adjacent to these areas that had less nitrogen.

Nitrogen is a mobile nutrient and will move to the areas of the plant where it is needed for growth. This would be especially true under low nitrogen supply conditions. The plant is starved for nitrogen and in the dense canopy with low light and reduced photosynthesis, premature senescence and leaf loss is occurring.

SUMMARY

Farmers are caught between a rock and a hard place. On the one hand, the market demands sudangrass with low nitrate levels. On the other hand, it appears that brown leaf is associated more prevalently with low nitrogen growing regimes. We need tonnage to be profitable and low nitrate at harvest. We need to grow sudangrass with a declining N level.

One broker indicated that the problem was more cosmetic in nature and that quality was a moot point since the sudangrass was fed for roughage rather than for nutrition. If the demand was high and the supply was low, then buyers were more lenient on grading. Once the market softened and supply was adequate, then buyers were more discretionary when grading the sudangrass and offered less money.

Regardless of the causes or perceptions, brown leaf is an economic problem when the defect is present in the stack and farmers are discounted 30-50% of the normal selling price.

PROPOSED RESEARCH

One objective is to determine if timing of N applications will affect the incidence of brown leaf i.e. supply all the N at the beginning of the crop as opposed to supplying it in increments with each irrigation. Also different forms of N will fit different growing situations in the summer. NH3 may be toxic to the plant in the summer with high temperatures. Other forms of N such as UAN32 may be more expensive, but higher amounts can be applied in the water in the summer as opposed to NH3. Urea is another alternative, but it will have application costs.