

# NEW SALINITY TOLERANT ALFALFA

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## ABSTRACT

Adequate supplies of good irrigation water for farming is becoming more and more challenging for alfalfa producers in recent years due to periodic droughts and higher urban demands for the limited supply of water. Directly related to the dwindling water supply for irrigation, is a growing problem of soil salinity. The increase in salinity is adversely affecting crop productivity and in some cases making portions of fields unprofitable and/or unfarmable. In irrigated forage production regions, the salinity problem is increasing as farmers move from flood irrigation to sprinkler irrigation as a means of conserving water and improving irrigation efficiency. Sprinkler irrigation systems apply significantly less water, and as a result, salts stay near the soil surface as compared to flood irrigation which tends to leach the salts down below the root zone. It has been said that any area utilizing irrigation for crop production will eventually have to deal with increased soil salinity. The salinity problem is increasing and farmers must learn to effectively manage salinity to remain profitable. One means of accomplishing this goal is by the utilization of high yielding genetically improved alfalfa varieties that are bred to perform in marginally saline affected soils as well as produce high yields under optimal (non saline) soil conditions.

**Keywords:** Alfalfa, salinity, salinity tolerance, water quality, and drought,

## INTRODUCTION

Alfalfa production losses due to salinity may occur in several forms. The most visual and obvious yield losses are related to poor stand establishment and /or mature plant stunting. However less obvious significant yield losses of 5-10% may be occurring throughout the overall field and only detectable if yields are compared to comparable non saline field production. Even good fields may have saline “Hot spots” that are unproductive due to the buildup of salt. Regardless of the severity of the salinity problem, there is often a significant portion of affected fields that are classified as marginally saline; in which planting improved genetics can have an immediate beneficial effect.

## SALT TOLERANT FORAGES: NEW TOOL TO COMBAT SALINITY

The development of new improved salt tolerant forage crops gives forage producers an additional means of minimizing salinity related production losses and an opportunity to improve profits by fully utilizing all the farm ground available to them.. Although the new advances in Salt tolerant genetics are a big step in combating salinity losses, producers should not consider it as the sole answer. Some saline problems are so severe that improved genetics will not solve the salinity problem alone. In those cases, utilizing superior genetics combined with sound soil and water management practices can provide an integrated approach to improving forage yield on both saline and marginally saline soils.

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## **SALINITY RELATED FORAGE YIELD LOSSES**

Alfalfa is often called the “Queen of Forages” and is well known for its high yield and forage quality. Its high forage value makes it a logical candidate for the development of salinity tolerant forage varieties. Early breeding efforts focused primarily on developing varieties with increased **germination under salinity stress** as a means of improving stand establishment. The first varietal releases displayed significant improvements in germination under salt stress when compared to unselected varieties. Subsequent varietal releases were in the area of **improved forage production under salinity stress**. The most recent salinity tolerant varieties now combine both germination tolerance and improved forage production under salinity stress. These genetic improvements have proven to be beneficial in marginal saline areas, first by improving stands in “saline hot spots” and later by increasing mature plant tolerance within established stands. This combined approach has resulted in significant forage yield improvements in fields with yield losses due to variable salinity stress. It should be noted that the **newer salt tolerant varieties also are top performing varieties in non saline soils**; but if needed they have the added benefit of the genetic trait for improved salinity tolerance. This combined trait makes them very well suited to provide maximum yields in variable saline conditions that occur in fields.

### **ADVANTAGES OF IMPROVED SALINITY TOLERANT ALFALFA VARIETIES:**

- (1) Improved stand establishment in “Saline Hot Spots” within alfalfa fields.
- (2) Minimizes forage yield reductions due to saline stress.
- (3) Dual purpose varieties provide top yields in non-saline fields as well as improved stand and yield performance on the marginal saline ground within otherwise productive fields.
- (4) Salinity tolerant varieties can help provide an integrated approach of reclaiming saline soils by combining improved genetics with sound soil and water management practices.
- (5) Saline tolerant varieties can minimize the adverse salinity effects of dairy manure applications on the stand life and forage yield of alfalfa fields.
- (6) Higher farm profits by maximizing available farmable acres and increasing yields on marginal farm ground.