Hi-Cal Liquid Calcium for Rice Crop

Suren Mishra, Ph.D.

TETRA

What Does Ca Do to Rice Crops?

- Importance of Ca for selective ion uptake by plants is well documented *(Hepler and Wayne, 1985)*
- Ca is reported to function on the root exterior by increasing the membrane selectivity for K (*Viets, 1944; Hepler and Wayne, 1985)*
- Enhancement of NH_4^+ absorption on rice crop by Ca was reported by *Krasaesindhu and Sims (1972)*
- Literature suggest that Ca and NH_4^+ applied simultaneously improves absorption of each other, resulting in high grain yield *(Krasaesindhu and Sims, 1972; Fenn et al, 1987)*

Hi-Cal – N Blends

- Recommended blends:
  - Hi-Cal and Urea
  - Hi-Cal and UAN

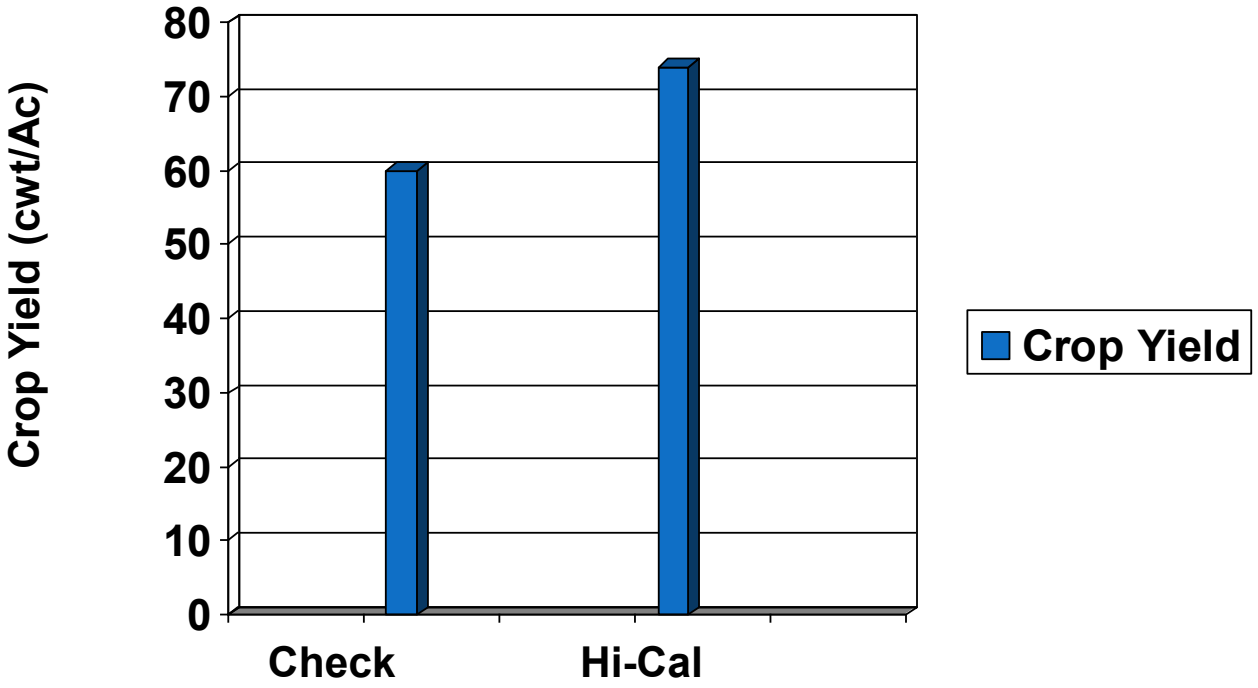
- How does it work?
  - Ca reduces ammonia volatilization – can be surface applied or applied at the time of flooding the crop
  - Improves retention of NH_4^+ in soil structure for longer period
  - Improves nitrogen use efficiency – increased NH_4^+ absorption
  - Increased absorption of NH_4^+, reduces the level of nitrogen (NO_3^-) in soil that is subject to leaching – environmental benefit

Hi-Cal – N Blends

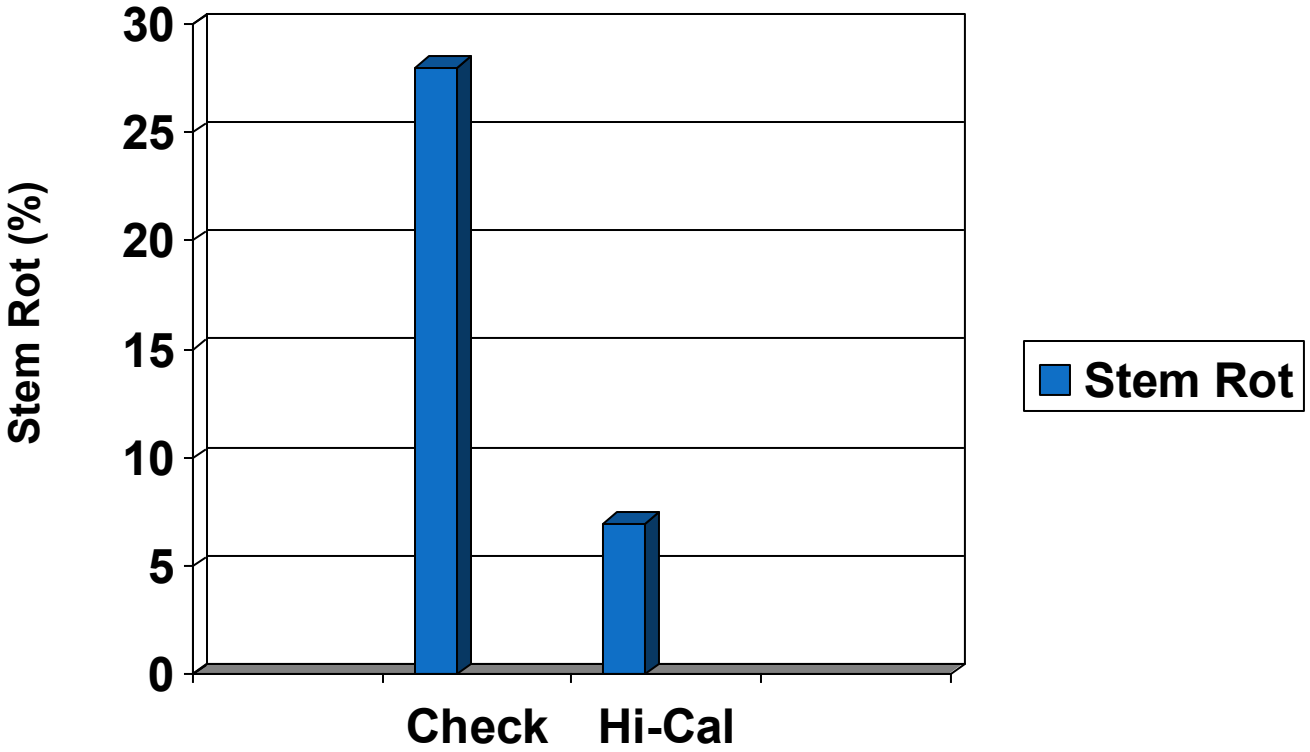
- How does it work ?
  - Plants uptake of NH_4^+ can be Four times higher than NO_3^-
  - NH_4^+ uptake is Twice as fast as NO_3^-
  - Increased photosynthesis promotes greater amount of CO_2 absorption by crop, which increases plant's organic building blocks
  - Increased Ca levels in crops lowers the leaf weight and increases the grains weight – increased grain yield
  - Improves uptake of other nutrients – Viet effect *(Viet, 1944)*
  - Disease control

Test Data from California Rice Field

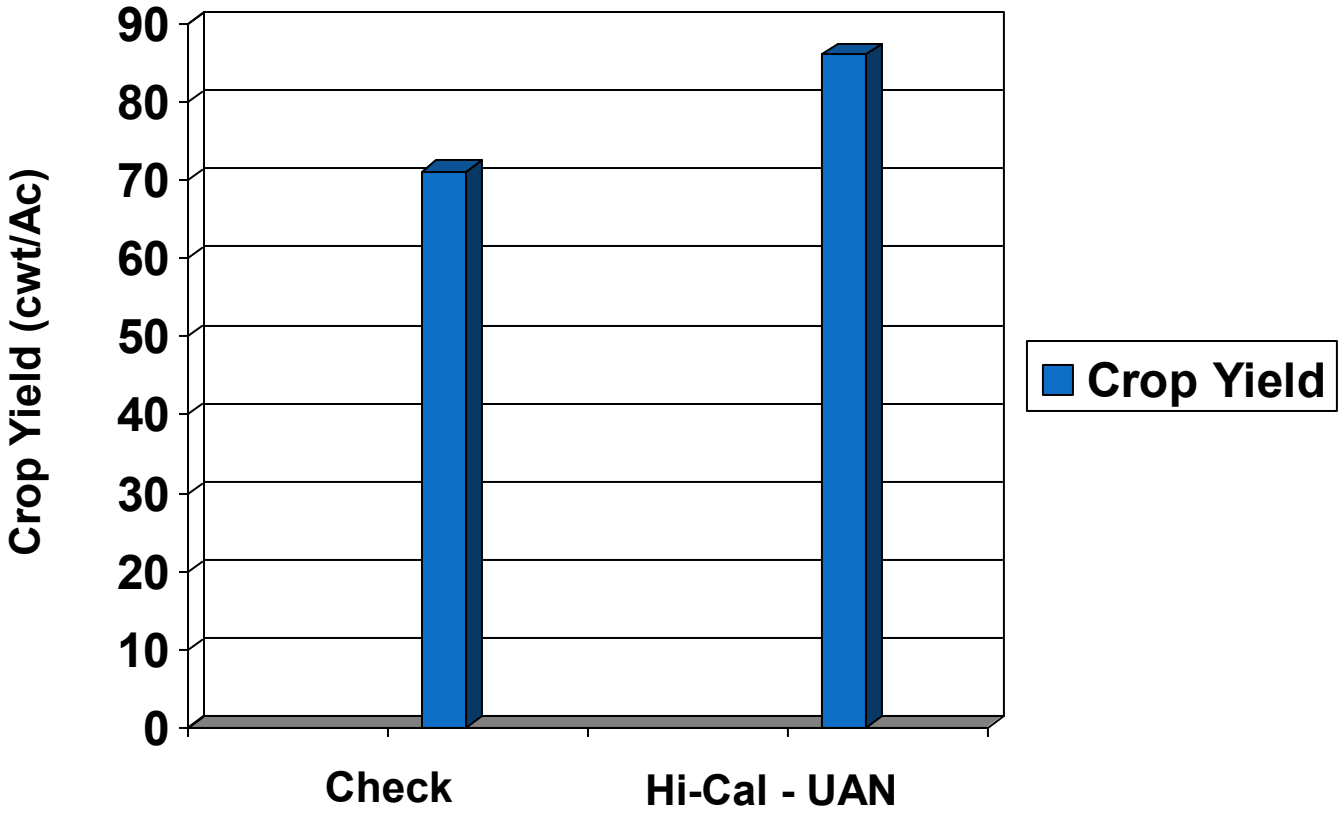
Rice Crop Yield Improvement with Hi-Cal



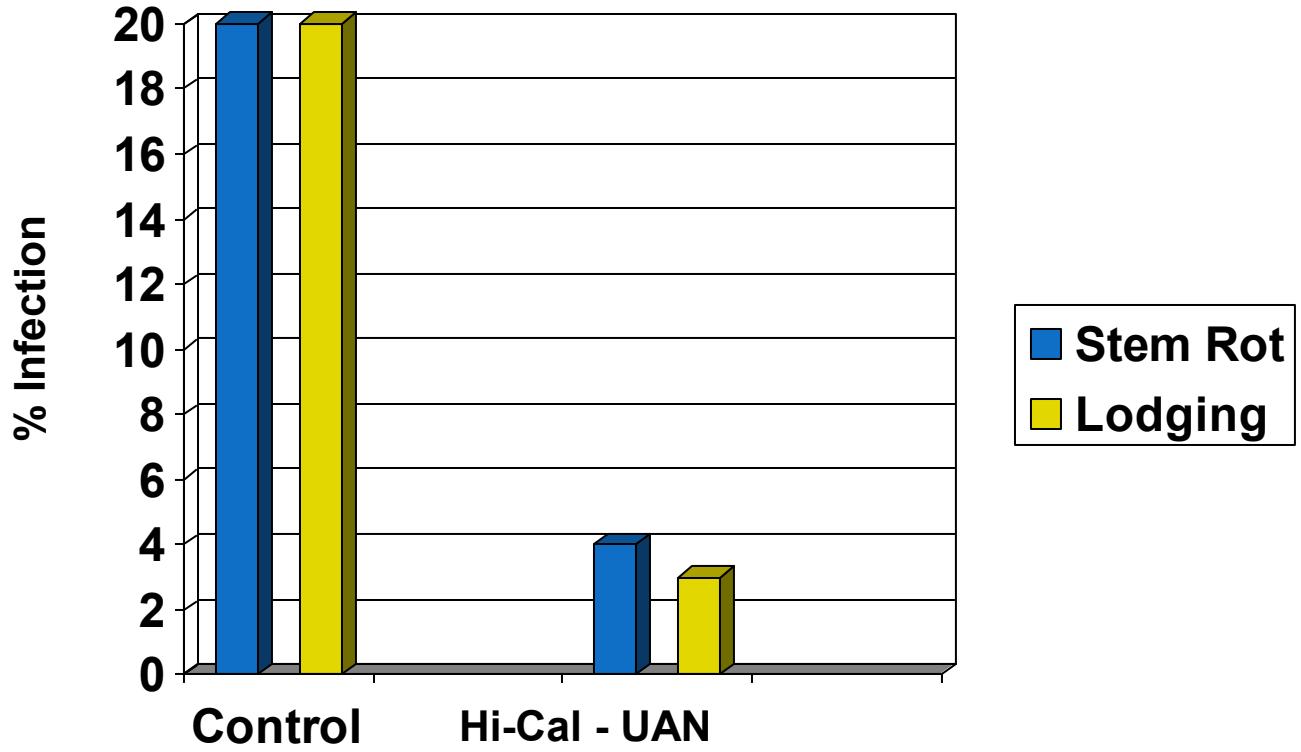
Disease Control in Rice with Hi-Cal



Rice Crop Yield Improvement with Hi-Cal – UAN Blend



Disease Control in Rice with Hi-Cal – UAN Blend



Recommended rates of Hi-Cal

- Water run:
  - 25 gallons per acre
  - Can be applied through center pivot or field sprinklers
  - Can be used as a carrier for herbicide (beaker test needs to be conducted to check the compatibility of Hi-Cal with the herbicide)
- Drip irrigation:
  - Apply up to 10 gallons per acre inch of irrigation water
  - Split applications may be appropriate

Caution: Do not mix Hi-Cal with sulfate or phosphate

References

- Viets, F. G. Jr. (1944), Calcium and other polyvalent cations as accelerators of ion accumulation by excised barley roots, *Plant Physiol.,* Vol. 19, pp 466-480

- Hepler, P. K. and R. O. Wayne (1985), Calcium and plant development, *Ann. Rev. Plant Physiol.,* Vol. 36, pp. 397-439

- Krasaesindhu, P. and J. J. Sims, (1972), Response of rice to nitrogen and calcium nutrition, *Soil Sci. Soc. Am. Proc.,* Vol. 36, pp. 457-461

- Fenn, L. B., R. M. Taylor and G. L. Horst, (1987), *Phaseolus vulgaris* growth in an ammonium-based nutrient solution with variable calcium, *Agron. J.,* Vol. 79, pp 89-91