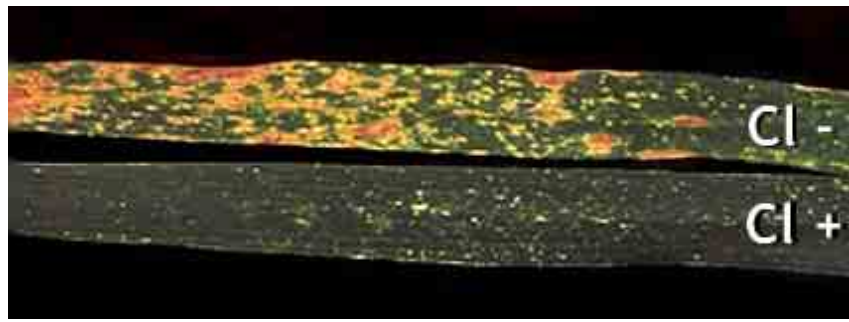
CHLORIDE – an essential nutrient

- Chloride is a micronutrient essential for plant development. It is required in small quantities by all crops.
- Chloride has a direct role in photosynthesis, is important in osmotic adjustment of the plant and plays an essential role in stomatal regulation.

Cl

CHLORIDE ROLE IN PLANTS

- Involved in photosynthesis
- Regulates function of several enzymes
- Essential for osmotic adjustment
- Stomatal regulation of water loss
- Transport of nutrients in the plant (Ca, Mg, K)
- Increases yields of cereal crops
- Reduces disease attack (in corn, wheat, barley, millet, asparragus, coconut, celery etc.)



Engel, R. E et al. 1997. A chloride deficient leaf spot syndrome of wheat. Soil Sci. Soc. Am. J. 61:176-184.

CHLORIDE IN CROPS

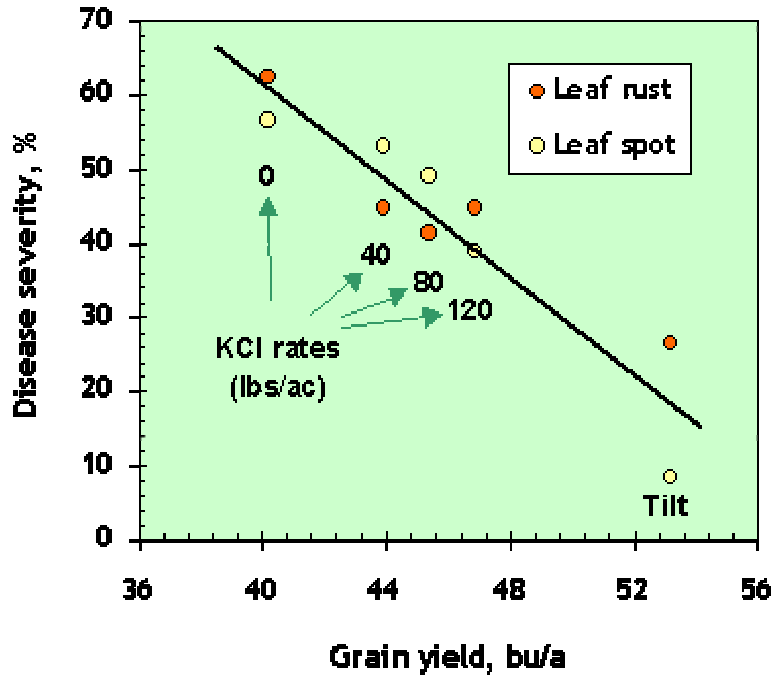
- The vast majority of crops are fertilized with potassium chloride, including field, horticultural and plantation crops. It it accounts for some 92% of world potassium consumption in agriculture.
- There are crops like coconut and oil palm, where chloride additions are an important part of nutrient management
- In areas far from the sea, where atmospheric deposition does not supply sufficient Cl (e.g. Great Plains Midwest of USA), yield benefits can be expected from Cl fertilization.

CHLORIDE RESPONSES

- For cereals, it was demonstrated that yield responses to KCl fertilization were due to the Cl component in this fertilizer
- Chloride fertilization has been reported to suppress a number of diseases in different crop species (cereals, coconut, etc).
- Chloride fertilization has been reported to suppress physiological disorders like wheat leaf spot and potato's hollow heart & brown center
- Chloride fertilization results in delayed leaf senescence and greater relative leaf water content in wheat

SUPPRESSION OF PLANT DISEASES USING CHLORIDE FERTILIZERS

Crop	Diseases
Barley	Common root rot, Fusarium RR, blotch rot
Celery	Fusarium yellow
Coconut	Gray leaf spot
Corn	Stalk rot
Pearl millet	Downy mildew
Rice	Stem rot, sheath blight
Wheat	Take all RR, common RR, stripe rust, leaf rust, Septoria



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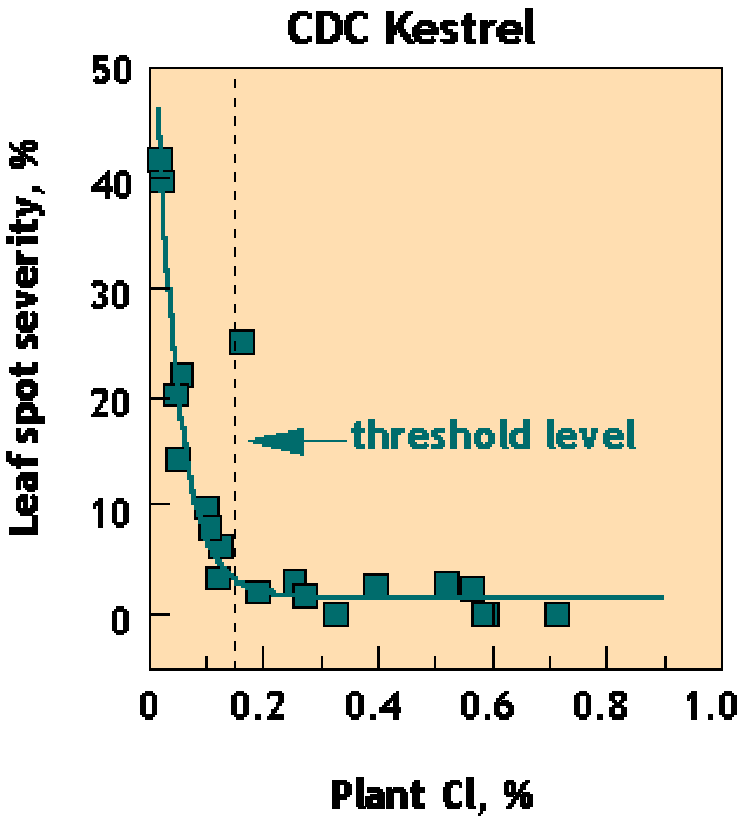
EFFECT OF CHLORIDE FERTILIZATION ON CORN GRAIN YIELD AND STALK ROT AVERAGE OF 1994 & 1995

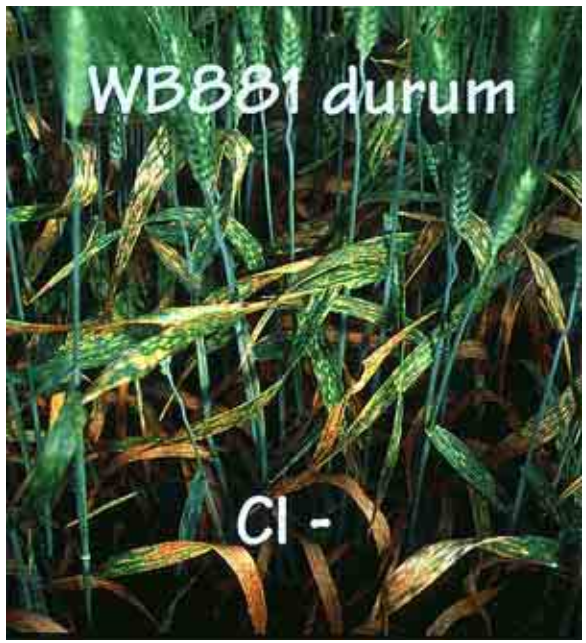
Treatment (kg Cl/ha)	Stalk rot (%)	Grain yield (MT/ha)	Ear moisture (%)	Stover moisture (%)
0	18	15.3	29.1	64
408 *	7	16.3	29.5	67

* equivalent to 560 K_2O/ha

Heckman, J.R. (1998). Corn stalk rot suppression and grain yield response to chloride. J. Plant Nutr. 21, 149-155.

PHYSIOLOGIC LEAF SPOT IN WHEAT IS CORRECTED BY CHLORIDE FERTILIZERS





Engel, R. E., P.L. Bruckner, D.E. Mathre, and S.K.Z. Brumfield. 1997. A chloride deficient leaf spot syndrome of wheat. Soil Sci. Soc. Am. J. 61:176-184.

Engel, R.E., P.L. Bruckner, and J. Eckhoff. 1998. Critical tissue concentration and chloride requirements for wheat. Soil Sci. Soc. Am. J. 62:401-405.

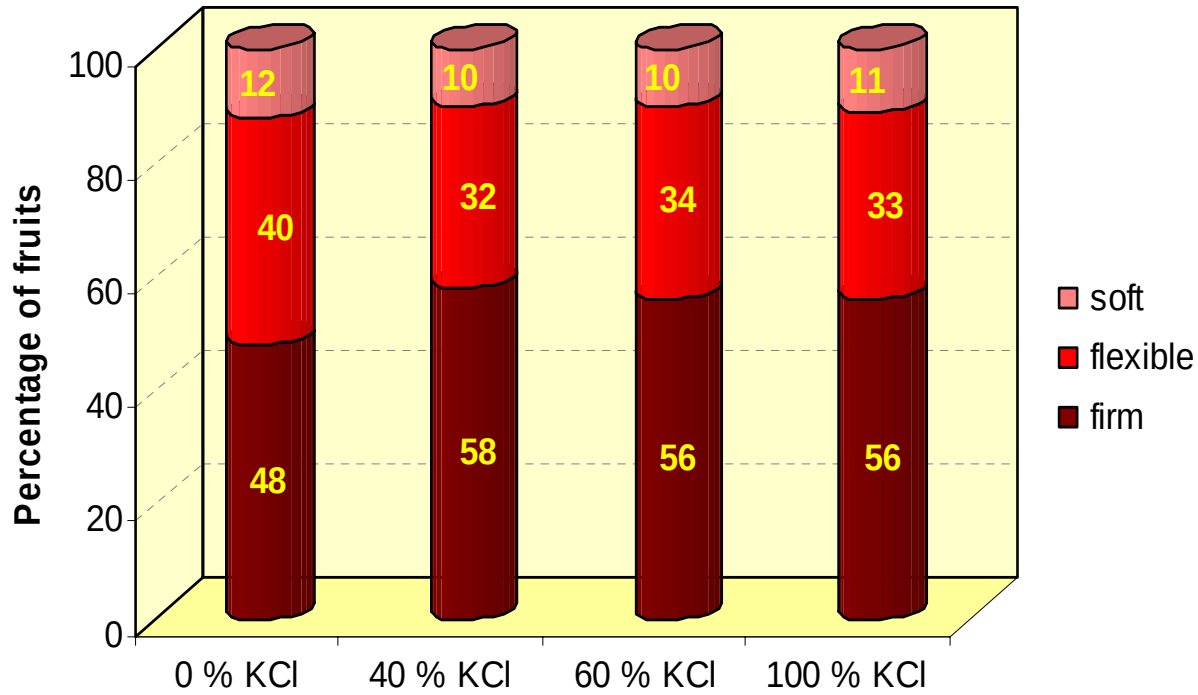
CHLORIDE IN SOILS

- Chloride exist in aqueous solutions as a monovalent anion and its salts are readily soluble.
- Consequently, it is not adsorbed by organic matter or clay in most soils, and does not readily precipitate out of solution.
- For these reason Cl is mobile in the soil and is readily leached where rainfall and/or irrigation exceeds evapotranspiration.

CHLORIDE FOR QUALITY

- Chloride can improve fruit quality of tomatoes and melons by reducing the water content of the fruit and thereby increasing the content of dry matter and of aromatic and other components that contribute to taste and appearance.
- Irrigated with saline water, **Desert Sweet** tomatoes are grown in the Negev Desert of Israel, creating the most flavoured tomato with a longer shelf-life.

CHLORIDE IMPROVES TOMATO QUALITY



Firm fruit implies:

- Less rotten fruit
- Less bruises during transport
- Longer shelf life

After storage simulation
Values are mean of 60 samples

Potassium Chloride Enhances Fruit Appearance and Improves Quality of Fertigated Greenhouse Tomato as Compared to Potassium Nitrate

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B. P. Chapagain; Z. Wiesman; M. Zaccai; P. Imas; H. Magen