Department of
LAND, AIR AND WATER RESOURCES
University of California, Davis
Climate Change • Sustainable Agriculture
Environmental Quality • Landscape Processes

FERTILIZER RESEARCH AND EDUCATION PROGRAM
FREP

Nutrient Management Guidelines for Major Crops in California

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Overview

- Project Objectives
- FREP Database
- Fertilization Guidelines

Project Objectives

Make research data and findings from different sources available to growers and crop advisors.

- Searchable database of FREP-funded projects
- Fertilization guidelines for major crops

Goals:

- Available online
- User-friendly
- Flexible design
- Concise summary of research results

The FREP Database

Online at:

http://www.cdfa.ca.gov/is/frep/

The FREP Database: Search Options

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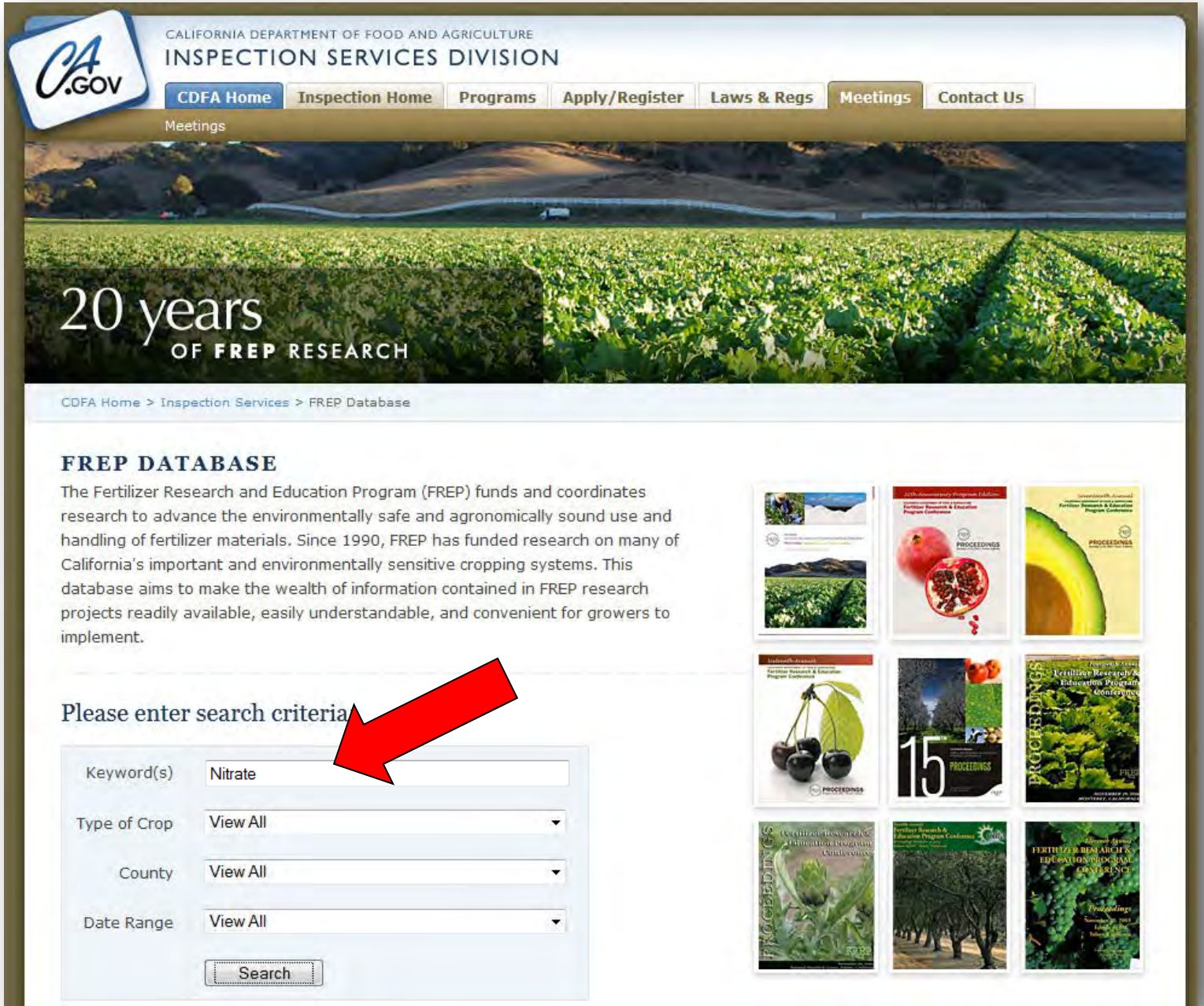


The FREP Database: Search Results

FREP DATABASE

Search results:

Study Title	ject County	Crop Type
Demonstration of Pre-Sidedress Soil Nitrate Testing as an N Management Tool	Monterey	Lettuce
Demonstration Program for Reducing Nitrate Leaching through Improvements to Irrigation Efficiency and Fertilizer/Cover Crop Management	Monterey	Lettuce
Determination of Best Nitrogen Management Practices for Broccoli Production in the San Joaquin Valley	Fresno	Broccoli
Development and Demonstration of Nitrogen Best Management Practices (BMP's) for Sweet Corn in the Low Desert	Riverside	Sweet Corn
Development and Promotion of Nitrogen Quick Tests for Determining Nitrogen Fertilizer Needs of Vegetables and Survey of Soil Residual Nitrate-Nitrogen Levels	San Benito, Monterey	Cabbage, Onion, Lettuce
Development of a Model System for Testing Foliar Fertilizers, Adjuvants and Growth Stimulants	Site independent	Arabidopsis used as model plant
Development of a Nitrogen Fertilizer Recommendation Model to Improve N-Use Efficiency and Alleviate Nitrate Pollution to	Yolo, Colusa	Almond

The FREP Database: Report Summaries

CDFA Home > Inspection Services > FREP Database

STUDY RECORD

Demonstration of Pre-Sidedress Soil Nitrate Testing as an N Management Tool

Hartz, T.K., Department of Vegetable Crops, University of California, Davis

Project Highlights

- Sidedressing to lettuce can be delayed as long as residual soil NO_3-N in the top foot of soil exceeds 20 ppm.
- Maximum yields can be achieved in fields with lower soil NO_3-N levels by sidedressing only enough to raise soil NO_3-N concentration to 20 ppm.

Crop
Lettuce

County
Monterey

The Fertilization Guidelines

- Summary of research findings
- 10 major crops

Fertilization Guidelines for Major Crops Grown in California

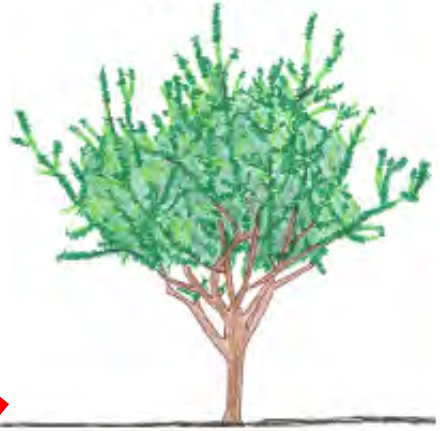
These guidelines are based on research results from studies carried out in California and elsewhere. For an optimal fertilization program, site-specific information on soil type, climate and crop management need also to be take in into account.

After choosing a crop from the list below, detailed information can be accessed by moving the mouse over any shape with the symbol ⓘ.

Cotton

Under Review!

Almonds



Under Review!

Processing Tomatoes

Additional Information

- Soil Test Sampling Instructions
- Sampling for Soil Nitrate Determination
- Soil Sampling in Orchards

Cotton Fertilization Guidelines

Funding provided by:

FREP

	Preplant	Sowing	Seedling Growth	First Square	First White Bloom	Peak Bloom	First Open Boll
Nitrogen (N)	Soil Test; Preplant N; Starter N				Petiole analysis; Sidedress N; Foliar N		
Phosphorus (P_2O_5)	Soil Test; Preplant P; Starter P				Petiole analysis; Sidedress P; Foliar P		
Potassium (K_2O)	Soil Test; Preplant K; Starter K				Petiole analysis; Sidedress K; Foliar K		

Cotton Fertilization Guidelines

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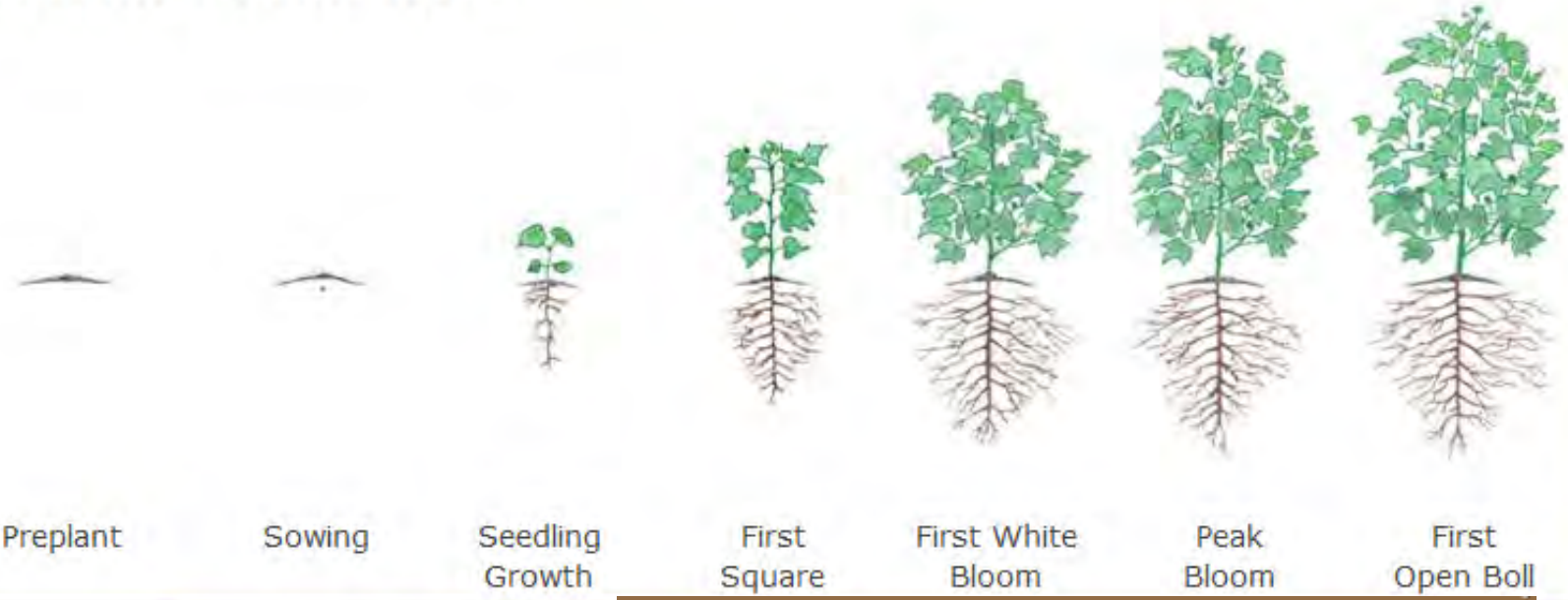

Nitrogen (N) ⓘ — Soil Test ⓘ; Preplant N ⓘ; Starter N ⓘ

Phosphorus (P_2O_5) ⓘ — Soil Test ⓘ; Preplant P ⓘ; Starter P ⓘ

Potassium (K_2O) ⓘ — Soil Test ⓘ; Preplant K ⓘ; Starter K ⓘ

Soil Nitrate Test

Soil samples for nitrate analysis should be taken near planting time or at least 3 weeks after the last N application [N31]. As cotton is a deep rooting crop, samples should be taken to a depth of at least two feet. The distribution of nitrate in the soil profile is very variable. For this reason, the estimation of the potentially available N is improved by taking samples deeper than 2 feet [N16]. The Cotton Production Manual recommends taking samples from the top 3 feet of soil [N31]. Due to the variability of nitrate in the soil, care must be taken that the sample is representative for the field (see Sampling for Soil Nitrate Determination).

The soil nitrate test measures the plant available N at the time of sampling. Its level depends on a number of factors (see Factors Affecting Soil Nitrate Concentrations in Spring). Therefore, the test result is field specific and needs to be determined every year.

Cotton Fertilization Guidelines

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Preplant | Sowing | Seedling Growth | First Square | First White Bloom | Peak Bloom | First Open Boll

Nitrogen (N)

Soil Test | Petiole analysis

Preplant N | Starter N | Sidedress N | Foliar N

Phosphorus (P_2O_5)

Soil Test

Potassium (K_2O)

Nitrogen fertilizers can be surface-applied or injected into the soil beneath the surface. Injecting the fertilizers into the soil ensures immediate access of plant roots. Except for sprinkler irrigation systems, surface applied fertilizers may remain on the soil surface for some time, delaying the availability to plants. In addition, surface-applied fertilizers containing urea or ammonium are prone to ammonia volatilization, especially when the soil pH is above 7 [N31].

Sidedress N

- Application Rate
- Mode of Application
- Fertilizer Type
- Time of Application

Conclusions

The guidelines …

… are a summary of research results

… include general information for crops grown in California ⇨ complement textbooks and site-specific recommendations

… can easily be expanded and updated

… include a list of references

Acknowledgements

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