Imperial County Agricultural Briefs

University of California
Agriculture and Natural Resources

Features from your Advisors

November 2016

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CARROT INSECT MANAGEMENT IN THE LOW DESERT PRODUCTION AREA OF CALIFORNIA

Eric T. Natwick, Entomology Advisor, UCCE Imperial County

California produces approximately 70 to 80% of the United States' carrots grown in three production areas. The largest acreage is grown in the southern San Joaquin Valley followed by the low desert region in southeastern California and the coastal region in southern California. Insecticide use patterns vary among the California carrot production areas depending on differences in climate, insect pests present and cropping patterns. Many, but not all of the insect pests of carrots in the low desert region are a result of dispersal from adjacent crops such as alfalfa.

Stand establishment pests such as crickets, cutworms, earwigs, grasshoppers, and flea beetle adults disperse from nearby fields or weedy areas. When abundant, these insects can be serious pests of carrots by feeding on seedlings either clipping-off the tops of or consuming the leaf tissue. Cultural control practices such as crop rotations, sanitation practices (removal of plant residue from nearby infested fields and removal of weeds) minimizes injury from pests and the need for pesticide applications. Seedling carrots may be treated with pyrethroid or methomyl insecticides labeled for carrots in California during stand establishment for control of crickets, earwigs, flea beetles, beet armyworm and granulate cutworm.

Planning crop rotation may help avoid injury from larvae of the palestriped flea beetle, *Systena blanda* later in the growing season. The gravid adult female flea beetles lay eggs in the soil and the larvae later hatch and feed on the roots of plants including carrots causing damage similar to cavity spot disease caused by the soilborne fungal pathogens *Pythium violae* and *P. sulcatum*. Rotating directly from alfalfa to carrots commonly results in damage from palestriped flea beetle larvae. Also, gravid adult flea beetles are strong flyers and may immigrate to newly planted carrot fields from adjacent alfalfa fields.

Adults of the sweetpotato whitefly, *Bemisia tabaci* also immigrate to carrot fields when dense populations buildup on adjacent crops in August through October. Whitefly adults have also been observed in mass migration swarms from cotton fields south of the United States border. Whitefly adults feeding on carrots in the low deserts of southern California may damage seedlings by the removal of plant sap. In addition to plant sap removal, feeding by moderate to high populations of whiteflies adults and nymphs can contaminate foliage with honeydew and

sooty mold, reducing photosynthesis. Soil injection of a neonicotinoid insecticide at planting may help prevent damage from sweetpotato whitefly injury.

Various species of aphids (bean aphid, *Aphis fabae*; cotton aphid, *Aphis gossypii*; green peach aphid, *Myzus persicae*; honeysuckle aphid, *Hyadaphis foeniculi*; and willow carrot aphid, *Cavariella aegopodii*) can become serious pests of carrots at any stage of development. In addition to direct removal of plant sap during feeding on carrots, aphids can also vector viruses that cause disease in carrots. Weed control and sanitation of crop residues in harvested crop fields adjacent to carrots can help reduce aphid population. Aphids have several natural enemies including parasitoids, predacious insects and entomopathic fungal disease organisms that usually help keep aphid populations below economic injury thresholds; thereby, reducing the need for insecticidal spray applications. Aphids have rarely been found on carrots in the lower desert regions when carrots are treated with a soil application of a neonicotinoid insecticide such as imidaclorprid or thiamethoxam.

In addition to the above mentioned aphid species, the low desert carrot fields are occasionally abandoned due to crown and root aphids (hawthorn/parsley aphids, *Dysaphis foeniculus* and *D. apiifolia*; tulip bulb aphid, *D. tulipae*; and hawthorn carrot aphid: *D. crataegi*) when dense colonies can reduce mechanical harvesting capabilities. Control of crown and root aphid is difficult. It is nearly impossible to penetrate the crop canopy to saturate crowns and roots with insecticides using post-emergence foliar sprays. Sanitation and crop rotation with non-host crops are important cultural controls to reduce the build-up of these aphids. These aphids feed near or below the soil surface. Ants attending aphids discourage the activity of predators and parasites, therefore predators and parasites are ineffective control agents of these aphids.

CIMIS REPORT AND UC DROUGHT RESOURCES

Khaled M. Bali, Irrigation & Water Mgmt Advisor, Director UCCE Imperial County
Sharon Sparks, Imperial Irrigation District*

California Irrigation Management Information System (CIMIS) is a statewide network operated by California Department of Water Resources. Estimates of the daily reference evapotranspiration (ET_o) for the period of November 1 to January 31 for three locations in the Imperial County are presented in Table 1. ET of a particular crop can be estimated by multiplying ET_o by crop coefficients. For more information about ET and crop coefficients, contact the UC Imperial County Cooperative Extension Office (352-9474) or the IID, Ag Water Science Unit (339-9082). Please feel free to call us if you need additional weather information, or check the latest weather data on the worldwide web (Google CIMIS for the current link to CIMIS site).

Table 1. Estimates of daily Evapotranspiration (ET_o) in inches per day

Station	November		December		January	
	1-15	16-30	1-15	15-31	1-15	16-31
Calipatria	0.14	0.10	0.07	0.07	0.08	0.09
El Centro (Seeley)	0.13	0.09	0.06	0.06	0.08	0.09
Holtville (Meloland)	0.13	0.10	0.06	0.06	0.08	0.09

* Ag Water Science Unit, Imperial Irrigation District.

Water and Drought Online Seminar Series

The latest research-based advice on weathering a drought is now available free online. The UC Division of Agriculture and Natural Resources is working to help farmers cope with the unwelcome outcome of historically low rainfall the last three years. UC scientists, with support from the California Department of Water Resources, have recorded video presentations on high-priority drought webpages.

Each presentation is about one half hour in length and is available at the link below:

http://ciwr.ucanr.edu/

Then click on the drought resources link.

Location:

Farm Credit Services Southwest
485 Business Park Way
Imperial, CA 92251

Time:

6:30 am - 12:05pm*
(Subject to Change)

Lunch:

Courtesy of Western Farm Press & Commercial Suppliers

No Cost To Attend!

To register or for more information contact...

University of California Cooperative Extension Imperial County

1050 E. Holton Road
Holtville, CA 92250
(760) 352-9474
aiestrada@ucanr.edu

- **Pesticide updates**
- **Education & Management of:**
  - **Insects**
  - **Plant Diseases**
  - **Weed Mgmt.**
- **Water issues**

Pending CEU's:

AZ Dept. of Ag, CA DPR & CCA

University of California
Agriculture and Natural Resources

POSITION VACANCY ANNOUNCEMENT

University of California Cooperative Extension
Division of Agriculture and Natural Resources

Area Cooperative Extension Advisor - Irrigation and Water Management
Serving Imperial and Riverside Counties
AP#16-14

LOCATION HEADQUARTERS: Holtville, Imperial County, California

CLOSING DATE: For full consideration, all application materials must be received by January 2, 2017 (open until filled)

POSITION PURPOSE: The Area Cooperative Extension (CE) advisor for irrigation and water management will conduct a multi-county based extension, education and applied research program with a focus on irrigation, water management, soil salinity, and water quality standards related to irrigated agriculture. The CE advisor will also address high priority and core issues related to limited water supplies in the region. Key clientele will include growers, farm managers, irrigation districts, pest control advisers, commodity groups, conservation/environmental groups, public agencies, and agricultural related businesses.

BACKGROUND: University of California, Division of Agriculture and Natural Resources (UC ANR), is the statewide division of the University of California that administers Cooperative Extension, which is responsible for local program development and delivery throughout the state of California. University of California Cooperative Extension (UCCE) is a network of colleagues with a focus on research, education programs, and outreach to resolve local challenges in communities where they live and work. UC ANR is the bridge between local issues and the power of UC Research. UC ANR's CE advisors, CE specialists and Agricultural Experiment Station (AES) faculty develop and deliver practical, science-based solutions that contribute to healthy food systems, healthy environments, healthy communities, and healthy Californians. To learn more about existing UCCE programs in these vibrant communities, visit: http://ceimperial.ucanr.edu/ and http://ceriverside.ucanr.edu/.

Our priorities in research, education, service, and resource allocation are guided by the UC Strategic Vision http://ucanr.edu/About_ANR/Strategic_Vision/. There are 5 strategic initiatives that ANR is currently focusing on: Endemic and Invasive Pests and Diseases (EIPD), Healthy Families and Communities (HFC), Sustainable Food Systems (SFS), Sustainable Natural Ecosystem (SNE), and Water Quality, Quantity and

Security (WQQS). This position will primarily address priorities found in the WQQS, SFS, and SNE Strategic Initiatives. The Strategic Plans for each strategic initiative can be found at http://ucanr.edu/sites/StrategicInitiatives/.

ACADEMIC EXPECTATIONS: All UC ANR CE advisors are responsible for performance in the areas of 1) applied research and creative activity, 2) extension of knowledge and information, 3) professional competence and activity and 4) University and public service.

Research: All UC ANR CE advisors develop and implement applied research programs to provide science-based information addressing complex issues. The CE advisor will provide essential leadership to address critical issues related to irrigation and water management facing irrigated agriculture in the two counties. The focus of the applied research program will be based on a needs assessment and may include partnerships with a variety of campus and county-based colleagues. The program should address issues of conservation and profitability in ways that are environmentally compatible and acceptable. The CE advisor will develop new information to enhance effective and efficient water management by designing and conducting research projects in cooperation with UC personnel, other Universities in the region, government agencies and other interested parties.

Extension of knowledge: County and community partners rely on UC ANR CE advisors as a critical resource for providing research-based information across a variety of disciplines. CE advisors disseminate appropriate, science-based information to inform clientele, using extension methods that are responsive to clientele needs and appropriate for the audience and situation. Science-based research results and other educational information will be disseminated using a variety of methods including individual consultations, presentations at producer and industry meetings, workshops, short courses, field demonstrations, UC ANR publications, newsletters, technical reports to commodity boards/funding agencies, peer-reviewed journal articles, and an appropriate mix of contemporary and emerging electronic tools (such as online learning, web content systems and repositories, social media, impact and evaluation tools), along with specialized and public media outlets. Programs will be developed and carried out in collaboration with other UC ANR academics and appropriate statewide efforts including UC ANR Program Teams and Workgroups, as well as related government and private industries. The CE advisor will develop and conduct educational and outreach programs that encourage the adoption of research based irrigation practices to improve irrigation efficiency and water quality in the low desert, including the Salton Sea Watershed.

Professional Competence: All UC ANR CE advisors are required to demonstrate professional competence in their programmatic areas. Professional competence includes participation in training activities to enhance professional development, such as administrative trainings, professional conferences, or workshops. Professional competence also includes activities that reflect professional standing within the programmatic area, such as presenting at conferences or workshops, holding offices in professional societies, invited presentations, or reviewing/editing publications.

University and Public Service: All UC ANR CE advisors are required to actively serve the University, as well as the public. University service may occur at the local, division, state, national, or international level. Examples of potential University service activities include serving on a university workgroup or committee, providing leadership in program teams, or advocacy efforts. Public service should involve activities and events in which the CE advisor uses their professional expertise to benefit groups or efforts outside the

University. Examples may include serving on external boards or councils, participating in community events, and leadership of non-University collaborative groups.

MAJOR RESPONSIBILITIES:

- Develop and implement effective UC ANR Cooperative Extension applied research and educational programs to address the identified priority needs of the clientele that are consistent with ANR's Strategic Vision and ANR initiatives http://ucanr.edu/sites/StrategicInitiatives/
- Conduct and report regular needs assessments to identify priority issues or problems relevant to the local clientele groups being served.
- Disseminate useful, science-based information to inform clientele, using extension methods that are responsive to clientele needs and appropriate for the audience and situation.
- Maintain and promote UC ANR CE's credibility and visibility by participating in professional organizations and collaborating with government agencies, commodity groups, allied industry groups, policy makers and other organizations by providing independent science-based information and leadership.
- Evaluate programs and report accomplishments, results, and potential or actual impacts to scientific and lay audiences through a variety of outreach methods.
- Develop collaborative teams with other UC ANR academics, including CE specialists, AES faculty, CE advisors and/or others, to address priority issues for UC ANR.

RELATIONSHIPS: The CE advisor is administratively responsible to the UCCE Imperial county director with input from the UCCE Riverside county director.

AFFIRMATIVE ACTION: An understanding of and commitment to UC ANR's affirmative action goals and commitments is expected of all CE advisors and county directors.

EDUCATION AND EXPERIENCE: A minimum of a master's degree is required though other advanced degrees are encouraged, in disciplines such as Water Resources/Sciences, Irrigation, Agricultural Engineering, Soil Science or other closely related discipline. Extension experience and demonstrated excellence in the areas of applied research is desired. Coursework and experience in statistical analysis, experimental design, soil fertility, soil physics, water quality, principals of irrigation and agricultural engineering, and geographic information systems is desired. Excellent written, oral and interpersonal communication skills are required.

SALARY: Beginning salary will be in the Cooperative Extension Assistant Advisor Rank and commensurate with applicable experience and professional qualifications. For information regarding Cooperative Extension Advisor salary scales, please refer to the University of California website: http://ucanr.edu/sites/anrstaff/files/250093.pdf

If the successful candidate is currently a UCCE Advisor with indefinite status, the candidate will be offered the position commensurate with applicable experience and professional qualifications with eligibility to retain such indefinite status.

BENEFITS: The University of California offers comprehensive benefits including two days per month paid vacation, one day per month paid sick leave, and approximately thirteen paid holidays per year. This position is eligible for sabbatical leave privileges as per the terms of University policy. For more information, refer to the UCnet website at: http://ucnet.universityofcalifornia.edu/compensation-and-benefits.

HOW TO APPLY: To be considered, applicants must electronically submit the following four components of the Application Packet to ANRacademicsearch@ucanr.edu:

1. Cover Letter
2. ANR Academic Application Form— from the ANR website at: http://ucanr.edu/academicapplication

   Please include a list of potential references. If you are selected for an interview, the search committee will contact the references you listed on the UC ANR application form (a minimum of four (4) and a maximum of six (6) names, current addresses, phone numbers and email addresses). Please do not send letters of reference.
3. CV or Resume
4. College Level Transcripts: Submit all university-level transcripts as a single PDF file with your application packet.

Application and associated materials will not be returned to the applicant.

A search committee will review all applications, interview candidates, and recommend individuals most suitable for the position.

For information regarding this position, please contact

University of California
ANR Academic HR
LeChé McGill
(530) 750-1281
E-mail Address: ANRacademicsearch@ucanr.edu
Internet: http://www.ucanr.edu/jobs

PLEASE REFER TO POSITION NUMBER AP #16-14 IN ALL CORRESPONDENCE

Dear California Alfalfa Grower or PCA/CCA:

Your help on a pest management survey is requested (this is limited to growers and Pest Control and Crop Advisors (PCAs and CCAs) who are working with alfalfa in California – all others can ignore).

There have been questions about how much farmers and PCAs have utilized IPM principles in alfalfa. Integrated Pest Management (IPM) was developed in alfalfa some 40 years ago to help address important pests such as alfalfa weevil, leafhoppers, aphids, as well as diseases and weeds, and to reduce pesticide use.

Pete Goodell (UC IPM Entomologist) has developed a survey to find out how much IPM ideas are now being used.

Please go to: http://ucanr.edu/blogs/Alfalfa/ and see the link to the survey. (https://survey.ncsu.edu/IPM/CAalfalfa/).

If you are interested in ongoing alfalfa information, you may also subscribe to the Alfalfa Blog at: http://ucanr.edu/blogs/Alfalfa/ The site posts something that might be of interest about 2x per month or so.

Eric Natwick and Oli Bachie,

on behalf of alfalfanet-request@ucdavis.edu
(Dan Putnam & Pete Goodell, UC Cooperative Extension)

NITRATE CONTENTS IN COTTON PETIOLES CAN BE AFFECTED BY VARIETY AND CROPPING SYSTEMS

Oli Bachie – Agronomy Advisor – UCCE Imperial County
Areli Pacheco –PhD Student at UABC – UCCE Imperial County

Cotton is still an important crop in California's low desert, particularly Palo Verde Valley, Blythe, Riverside, CA. and major areas of the Mexicali Valley in Mexico. Pest infestation, lower yield, increased production cost, poor market and lower commodity prices have resulted in declining interest in cotton production in the Imperial Valley, an area that once was known as a cotton growing belt. An ongoing research is being conducted to evaluate the influence of varieties and cropping systems (conventional versus standard) on yield of commonly used cotton varieties. Conventional or standard cotton production typically employs wide bed (38 or 40-inch), planted to a single line of seeds, resulting in lower crop population densities per acre. Narrow planting involves the use of narrower bed sizes or planting in two lines over the same standard size beds. Lower plant populations, as commonly practiced with standard wide row planting, may require longer time to grow into a closed canopy and is expected to have lower yield. Part of the ongoing trial was to look at the effects of varieties and planting practices on cotton crop nitrate uptake. This documents presents some preliminary results on NO_3 concentrations in petioles of cotton varieties planted following a high (narrow row) or standard (low) cropping density.

This field research was conducted at the UC Desert Research and Extension Center (DREC). Three varieties, DP1044B2RF (C1), a straight type variety, DP1359B2RF (C2) a columnar type variety and DP 1555 B2RF (C3), a bushy grown variety were used for the experimentation. For the traditional wide row planting, crops were planted on a 40" bed (common local practice) in single rows. The narrow row spacing used the same 40" bed, but planted in double lines. Accordingly, the narrow row planting had approximately double plant population densities per plot as the traditional planting practice. Each treatment plot was 4 beds of 40" wide and 35 ft long. All varieties were seeded at 3 to 4 inch between seeds and at ¾th inch deep. Treatment plots were laid out in a Completely Randomized Block Design (RCBD) with four replications. The treatment plots were separated with a 5 ft alley (unplanted) and 10 ft guard plants around the perimeters. Other than the planting space and varieties, all crop maintenance and inputs were applied universally following growers practices. All plots were pre-

fertilized with 250 pounds of nitrogen per acre and furrow irrigated the next day of planting. Additional fertilizers were supplied through fertigation before the 1st bloom and as needed thereafter.

While there were various data collected and still being collected, we shall only present the effect of planting systems and cotton varieties on NO_3 concentration in crop petioles. Cotton plants were sampled for petiole NO_3 concentrations at 60, 77, 106, and 121 days after planting (DAP), representing the square formation, peak bloom, cutout and open boll stages of crop growth, respectively. During each sampling period, 20 petioles from the fifth node below the tip of the main stem were collected per treatment replication and samples deposited into sealable plastic bags. Nitrate concentrations were determined using a hand held Nitrate meter, HORIBA LAQUA twin Nitrate Ion meter by placing 5 drops of petiole extracts and recording the nitrate concentration levels directly. All data collected were analyzed for statistical significance using ANOVA with the SAS version 9.0 software. Differences between treatment means were detected with the LSD (α=0.05) and determined for significance.

Our preliminary findings from a one year cropping season suggests that Petiole nitrate concentration of cotton varied depending on cotton growth stages, the type of variety and the cropping systems. Petiole NO_3 concentrations increased until crop cutout stage and then declined at the open boll stage for all varieties planted to narrow row. However, variety two (C2) and variety 3 (C3), planted with standard planting system had swinging NO_3 concentrations from the start of the sampling to the open boll stage. The latter varieties under the standard planting system had the highest petiole nitrate concentration at the square formation and cutout stages compared to the peak bloom and open boll stages (Table 1). Variety 1 (C1) the highest NO_3 petiole concentration at the square formation stage , but plunged at towards the end of crop development; the open boll stages, suggesting that this variety under standard cropping system may have less available nitrate to promote reproductive growth and may result in a lower yield performance compared to the narrow row cropping system.

Table 1: Nitrate concentration in cotton petioles under narrow and standard planting systems at various crop growing stages

Treatment	Crop stage			
	Square (1st simple)	Peak Bloom (2nd Sample)	Cut Out (3rd Sample)	Open boll (4th simple)
CIS	8075a	5925ab	5775b	3775a
C2S	7725a	7450a	8675a	3950a
C3S	6675a	4700bc	6450ab	4725a
C2N	5325ab	6100ab	7175ab	4075a
C3N	4850ab	5025abc	5650b	4200a
C1N	2750b	3008c	5150b	4225a
Pr>F	*0.0470*	*0.0295*	*0.1456*	*0.9129*

As plants aged (the cutout and open boll stages), there were no difference in petiole NO_3 concentrations among the varieties and cropping system treatments (Table 1). All varieties had relatively higher petiole NO_3 concentrations at the beginning of our sampling, the square formation than at the open boll stage. In the meantime, all varieties had higher petiole NO_3 concentrations when planted under standard cropping system than the respective narrow row planting (Table 1), particularly at their early growth stages. Variety 1 (C1) seem highly affected for its petiole NO_3 concentration when planted in dense crop populations (narrow row). Those results are clearly shown in Figure 1.

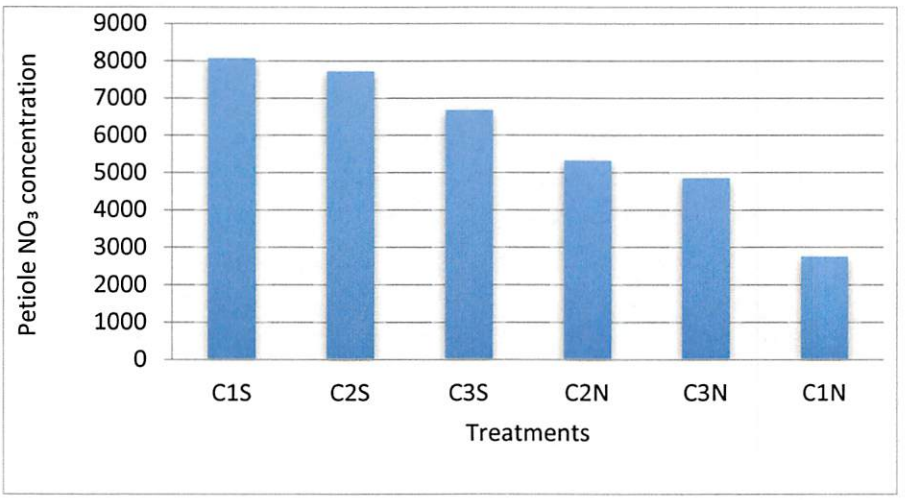

Figure 1: Petiole NO_3 concentrations in different cotton varieties planted under standard and narrow row cropping systems.

When averaged over the cropping systems, we observe that variety 2 (C2) has more aggressive nitrate uptake and accumulation in petioles than varieties 1 and 2 (C1 and C2), respectively (Figure 2). This result reveals that varieties with columnar structure may have a better advantage of nitrate absorption than the other varieties that have varying structural growth. Furthermore, cotton seems to absorb more nitrate when dispersedly planted (standard) that when planted densely (Figure 3). Similarly, when averaged over varieties, cotton crops seem to accumulate more nitrate in their petioles, if they were grown with standard than under narrow row (high density) planting practices (Figure 3). The latter responses may be an indication of plant competition for nutrition under higher plant population densities. The indication of petiole nitrate accumulation and its relationship to yield will be further investigated following an upcoming cotton seed data collection.

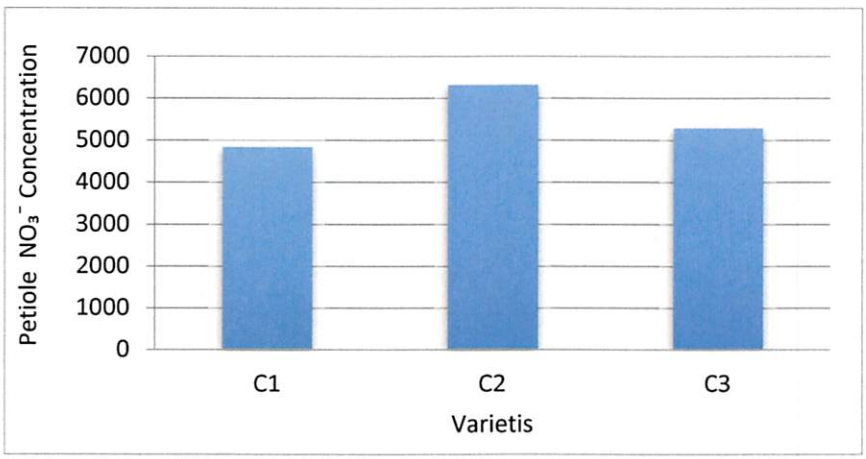

Figure 2: Petiole NO_3 concentration in three cotton varieties averaged over cropping system treatments

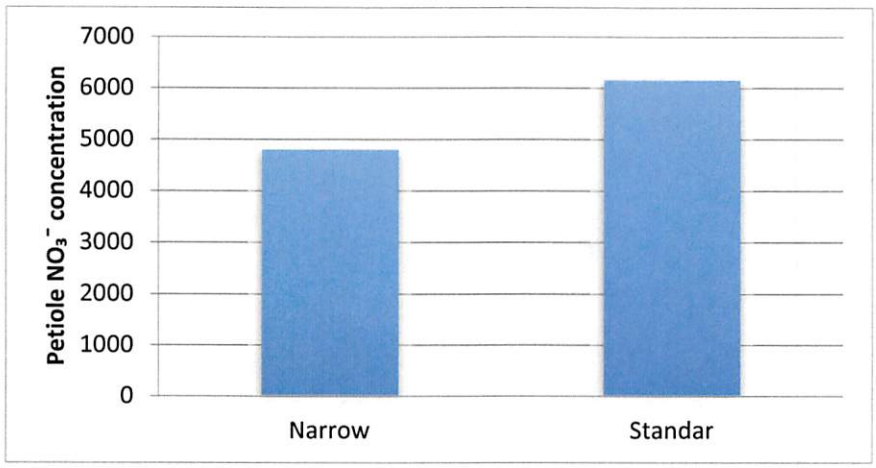

Figure 3: Petiole NO_3 concentration in cotton with two planting systems averaged over three different cotton varieties.

In summary, NO_3 concentration in plants which may be a measure of crop nutrient uptake is affected by plant architectural characteristics and planting systems directly affecting inter-plant interactions that could be useful for cotton crop management. It must be noted that the three varieties have contrasting architecture, a tall stature, columnar type and a short stature and bush type. We observed that crop vegetative and reproductive growths were variable depending on varieties and cropping systems as well (data not presented) and might have been the reason for the capacity of the crop varieties to absorb and accumulate nutrients such as NO_3. All varieties had higher NO_3 concentrations when planted under standard cropping system than under the narrow row spacing, but some are affected more than other varieties. While this preliminary finding is not yet conclusive, it reveals the existence of differences in responses of cotton to the type of varieties and planting population densities. At the end of the trials, which will last for two more years, we will be able to provide more accurate information on cotton NO_3 absorption and accumulation patters along commonly grown varieties, their respective cropping systems and yielding potentials