

Sweet Spanish Colorado Number 6: An 80-year history that provides a unique insight into the improvements and challenges in onion culture



Dr. Mike Bartolo
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Relation of Temperature and Rainfall to Development of Xanthomonas and Pantoea Leaf Blights of Onion

Howard F. Schwartz, Kristen L. Otto, and David H. Gent, Colorado State University, Fort Collins, CO 80523-1177

J. AMER. Soc. HORT. Sci. 121(4):604-608. 1996.

Combining Abilities for Yield and Bulb Quality among Long- and Intermediate-day Open-pollinated Onion Populations

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Agricultural Research Service—U.S. Department of Agriculture, Department of Horticulture, 1575 Linden Drive, University of Wisconsin, Madison, WI 53706

William M. Randle²
Department of Horticulture, University of Georgia, Athens, GA 30602-7272

HORTSCIENCE 29(12):1465-1467. 1994.

Yield and Growth Response of Onion to Simulated Storm Damage

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Press Bulletin 75

THE COLORADO EXPERIMENTAL STATION
FORT COLLINS, COLORADO
January, 1931

Onion Irrigation and Nitrogen Leaching in the Arkansas Valley of Colorado

1990-1991
J.E. Ellis,
A.E. McSay¹,
P.N. Soltanpour²,
F.C. Schweissing³,
M.E. Bartolo³, and E.G. Kruse⁴

300+ Research Trials

Evaluating Iris Yellow Spot Disease Incidence and Severity in Onion Germplasm of Varying Leaf Characteristics

Christopher S. Cramer^{1,3}, Neel Kamal², and Narinder Singh²
Department of Plant Pathology and Environmental Sciences, New Mexico State University, Las Cruces, NM 88003-8003

THE ARKANSAS VALLEY
By E. J. ALLEN
Research Assistant in Horticulture
Central Sub-Station

Colorado State University
Extension

Botrytis, Downy Mildew and Purple Blotch of Onion

Fact Sheet No. 2.941

Crop Series | Diseases

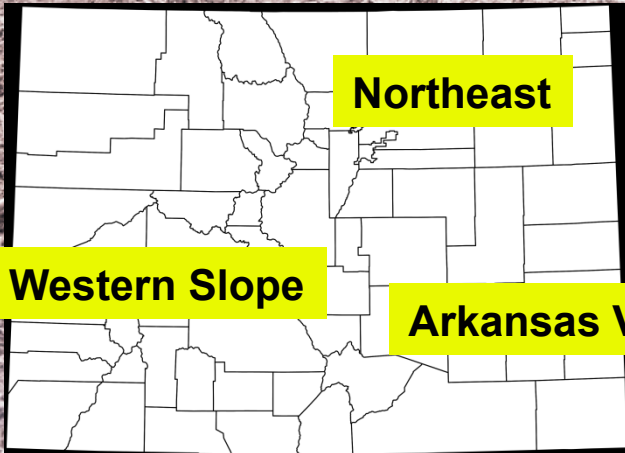
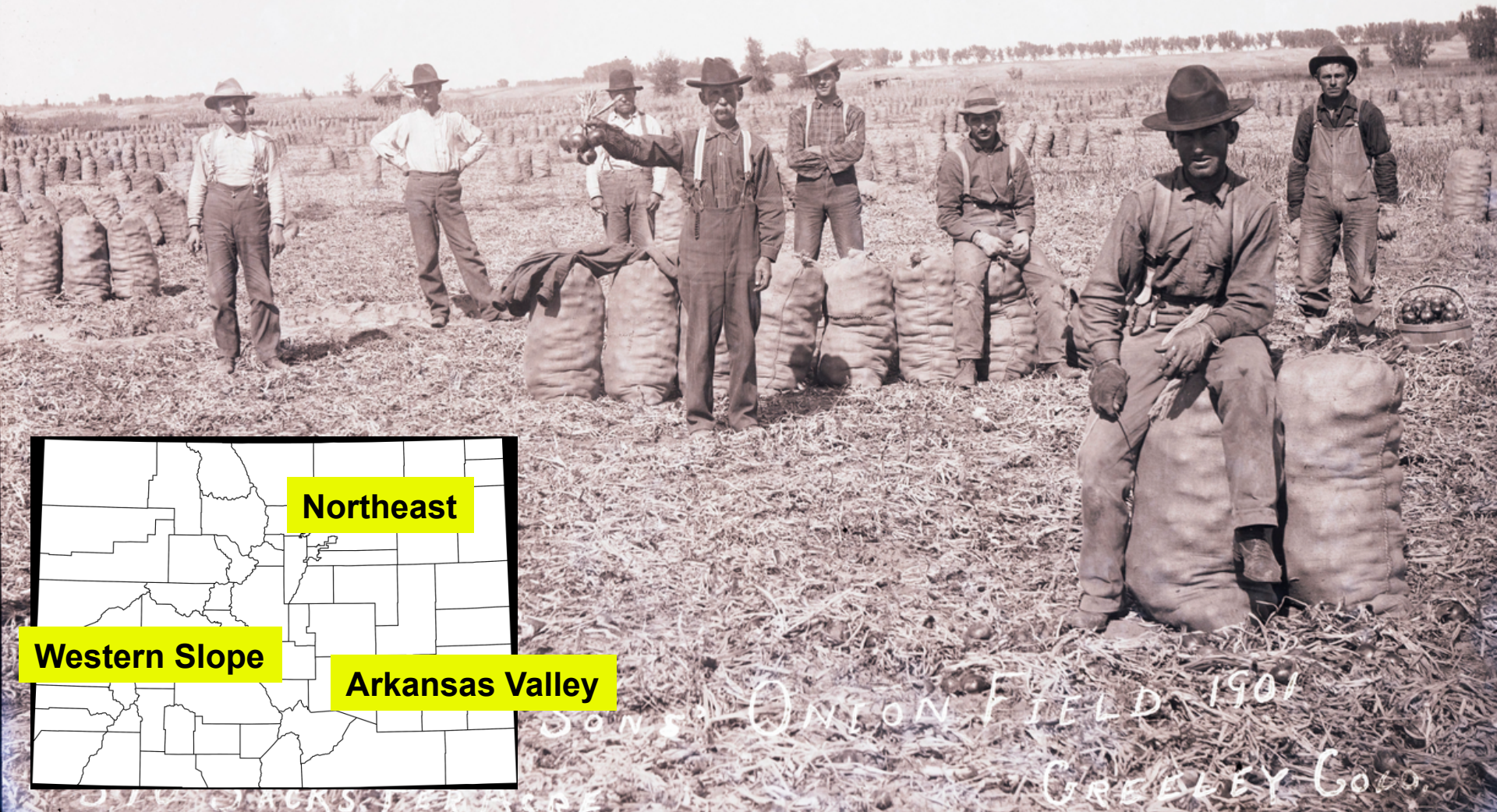
PLANT RESISTANCE

Evaluation of Onion Cultivars for Resistance to Onion Thrips (Thysanoptera: Thripidae) and Iris Yellow Spot Virus

by H.F. Schwartz*

JOHN DIAZ-MONTANO,^{1,2} MARC FUCHS,³ BRIAN A. NAULT,¹ AND ANTHONY M. SHELTON¹

Colorado Onion History



SONS ONION FIELD 1901
GREATLEY CO.

Early Variety Trials



THE COLORADO EXPERIMENT STATION

FORT COLLINS

A PROGRESS REPORT ON ONION INVESTIGATIONS IN THE ARKANSAS VALLEY

By E. J. ALLEN

Research Assistant in Horticulture

Variety	Corrected yield per acre (Pounds)	Percentages different grades*				Doubles	Percent- age Stand	Actual yield per acre (Pounds)
		0 to 1 in.	1 to 2 in.	2 to 3 in.	3 in. and up			
Valencia	42,859	.....	2.51	49.27	43.08	5.10	53.16	21,624
Ailsa Craig	31,210	.....	10.66	53.75	12.57	24.08	42.29	11,568
Denia	26,638	.....	14.9	65.48	7.94	11.24	38.01	10,648
Gibraltar	23,655	.....	17.28	60.70	14.85	7.62	58.95	13,125
Prizetaker	19,903	.....	.....	.....	.....	.....	10.65	2,134
Yellow Globe								
Danvers	15,845	28.98	47.38	18.37	.....	5.26	56.89	8,189
Ohio Yellow Globe.....	15,281	13.06	32.83	51.15	.....	2.92	57.72	7,618
Mountain Danvers..	14,219	24.78	31.47	40.76	.....	2.84	53.0	5,866
Australian Brown..	13,096	23.8	35.83	40.3	.....	.....	50.99	6,602

*Percentages of different grades based on 1 year's results (1930).

E.P. Sandsten



A.M. Binkley





Herman Fauber



Selection and Release of Colorado No.6 in 1936

RESULTS OF VALENCIA STRAIN TESTS
1929-30

Strain	Corrected yield per acre, lbs.	Percentages Different Grades*				Percent- age Stand (Pounds)	Actual yield per acre
		3 in. and up	2 to 3 in.	1 to 2 in.	Doubles		
Colorado No. 1.....	53,141	44.93	46.58	4.71	5.18	53.2	22,444
Colorado No. 2.....	50,548	45.49	41.6	2.81	9.98	47.23	23,113
California No. 1.....	46,508	38.31	35.76	8.29	17.64	39.51	19,155
California No. 2.....	43,875	36.67	49.56	7.67	6.18	52.62	22,733
California No. 3.....	40,822	34.38	43.82	10.07	13.96	46.91	18,935
California No. 4.....	36,934	29.85	46.71	5.86	21.09	42.65	15,821
Spanish Seed**	45,848	43.51	36.47	3.64	15.8	48.15	21,943

*Percentage of different grades based on 1 year's results (1930).

**Grown 1 year (1930).

ONION HYBRID TRIALS AND BREEDING

R. L. Foskett

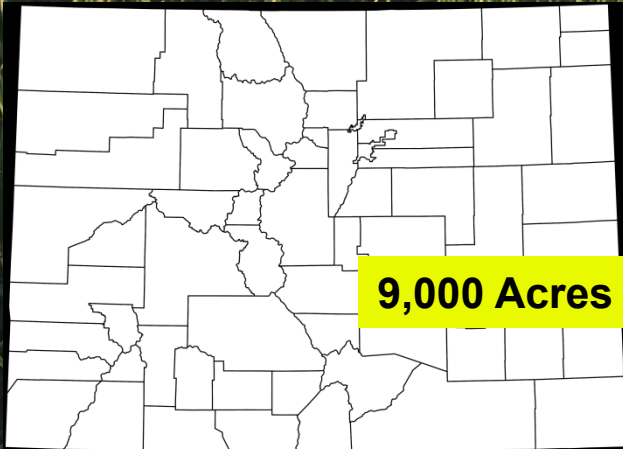
Both late and early maturing hybrids were tested in the 1958 hybrid onion trials. Among the later maturing ones, hybrid No. 4, 2228 x Colorado 6 performed very well and produced an excellent appearing



Notable progress has been made in onion breeding. Dr. R. L. Foskett, Experiment Station Horticulturist, examines a selection taken from the 1958 crop.

Table 1.--Yield and percentage loss in storage for three commercial onion varieties and six F₁ hybrids

Variety or Hybrid	Yield 5C# sacks per acre	P.B. %	Fusarium Basal Rot %	Bot- rytis Neck Rot %	Total Rot Loss %
Colorado #6	913	2.5	6.0	3.3	11.8
Sweet Spanish (P.W.)	900	5.7	2.9	4.3	12.9
Colo.82 x BYG 97	843	0.0	11.5	2.1	13.6
BYG 2228 x Colo.S-8	817	1.5	1.5	1.5	4.5
Colo. 80 x Colo. 83-1	756	0.0	5.5	0.0	5.5
Sweet Spanish (Currier)	744	1.5	1.5	4.5	7.5
Asgrow 43	712	1.1	9.1	0.0	10.2
Asgrow 44	594	0.0	7.7	1.5	9.2
Asgrow 42	556	0.0	6.4	5.6	12.0
L.S.D.	101				

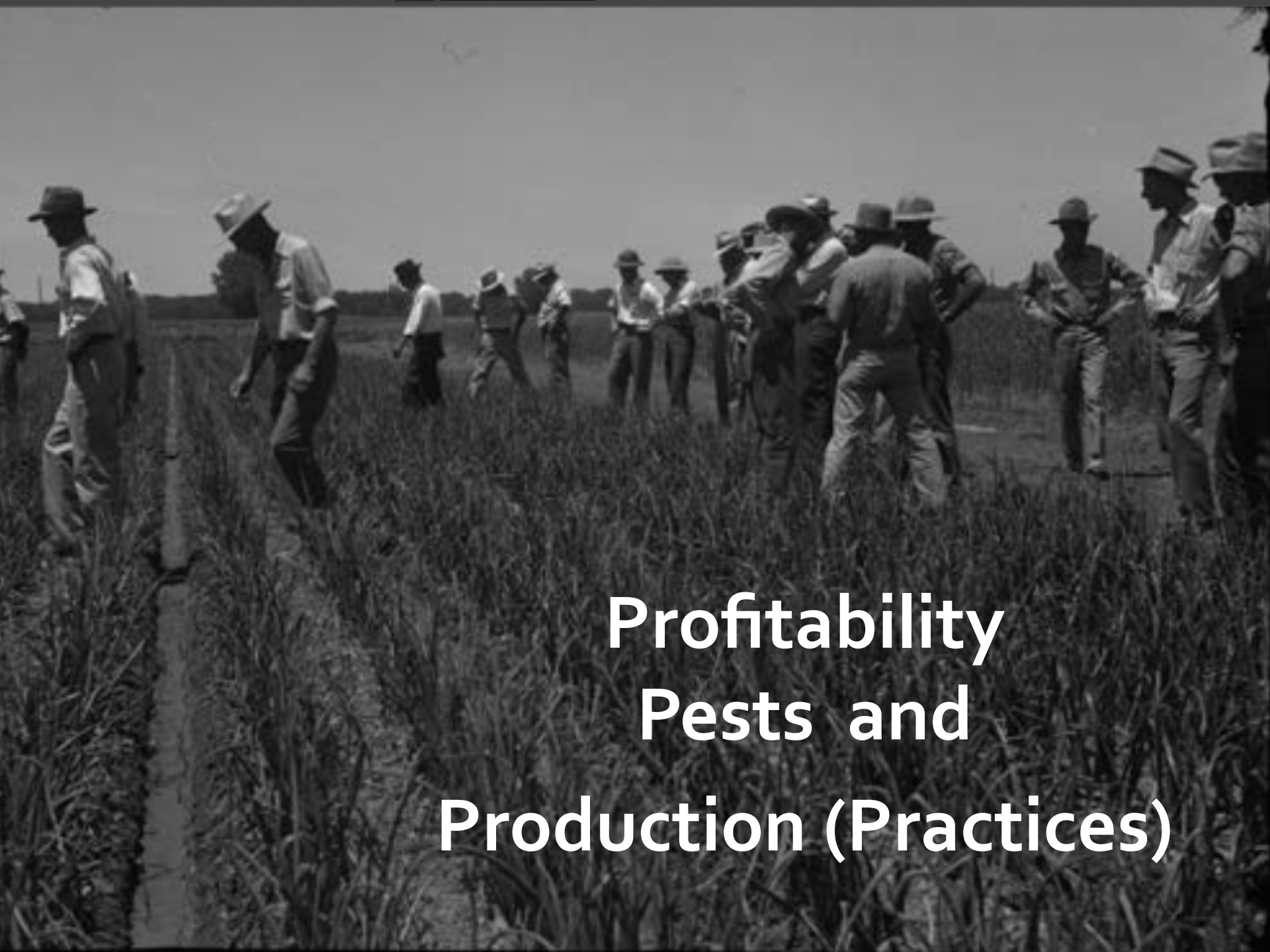


ONION VARIETY TRIAL

Arkansas Valley Research Center
Colorado State University, Rocky Ford, Colorado, 2012

Variety	Source	Maturity (% tops down) 9-9-12	Colossals > 4" %	Jumbos 3"-4" %	Medium 2.25"-3" %	Pre-Pack 1.75"-2.25" %	Total Market. 50# bags/A	Culls %	Total Yield 50# bags/A
Colorado 6	Burrell	20	13.7	68.1	8.3	0.7	1389.5	9.3	1529.0
TTA-747	Takii	35	4.2	70.0	17.3	0.2	1306.8	8.4	1422.2
Vaquero	Nunhems	62	0	68.2	23.3	2.3	1269.8	6.3	1355.8
Barbaro	Seminis	45	0	62.8	25.9	3.3	1203.3	8.0	1306.8
X-Y201	Waldo	30	10.1	71.2	11.3	0.8	1190.3	6.5	1274.1
X-Y202	Waldo	30	7.8	66.3	8.8	0.8	1188.1	16.3	1428.8
Granero	Nunhems	72	0	62.4	30.7	4.1	1161.9	2.8	1193.5
Maverick	Nicker-Zwaan	20	3.3	52.7	22.8	3.6	1139.1	17.6	1384.1
NUN8003ON (W)	Nunhems						87.9	8.9	1167.4
Cometa (W)	Nunhems						84.6	7.6	1173.9
Joaquin	Nunhems						84.6	14.5	1267.6
Pandero	Nunhems						42.2	13.2	1191.4
Swale	Seminis						26.9	9.6	1135.8
T-866	Takii						12.8	15.8	1196.8
Sarape Café	D. Palmer						37.7	6.9	1062.9
Trigger	Crookham						71.4	14.5	1131.5
Anillo	Nunhems						56.1	8.8	1048.7
Morpheus	Crookham						55.1	22.0	1219.7
Legend F1	Bejo						46.3	13.2	1089
Centerstone	Takii						45.3	7.4	1030.2





**Profitability
Pests and
Production (Practices)**

COST OF PRODUCTION AND YIELDS

It is a noteworthy fact that comparatively few of our growers seem to know the cost of production of their crop. As a business proposition, onion growing as well as other crops must be carefully considered from the standpoint of cost as well as that of production and market values if we are to make a successful business. Various growers with whom we have talked have made various estimates of this cost. One of the most successful growers and one who has been in the work for fifteen years has given the cost of production as follows: (This cost is based on a five-acre unit, or that which is considered to be what one man can handle during the season.)

One man, six months.....	\$360.00
Manure for the land.....	75.00
Plowing and harrowing.....	15.00
Sacks for harvesting.....	225.00
Seed	60.00
Lifting	5.00
Hauling to market	35.00
Total	<u>\$775.00</u>

The weeding, irrigating, and other labor is considered in the wages of the one man for six months. This gives us a total cost of \$805, or \$161 per acre. This is based upon a production of 350 sacks of 115 pounds each per acre. While this may be a little high for the average cost over the state, it is probable that it is not far from correct and does not include taxes, interest on investment, or depreciation of tools, although the latter item is of comparatively small importance, as one of the factors in favor of onion growing is that comparatively little machinery or horse power is required for onion culture. This leaves the grower \$241.50 per acre from which must be deducted the taxes, interest, and depreciation. While this looks like a big income per acre, one must remember that the limit of the acreage per man is decidedly low. Some growers estimate that a man can take care of six or seven or even eight acres. It is doubtful in most cases if it will pay

Onion Variety – Thrips Tolerance Trials 2008-09

Arkansas Valley Research Center, Colorado State University, Rocky Ford, Colorado,
Whitney Cranshaw and Michael Bartolo

Variety	Spray Treatment	Total Market Weight 50 lb. bags/A 2008	Total Market Weight 50 lb. bags/A 2009	Percent Yield Increase Due to Spray Control 2008	Percent Yield Increase Due to Spray Control 2009	Percent Yield Increase Due to Spray Control 2 year Ave.
Colorado 6	Spray	1265.4	1446.1	13.5	4.5	2.4%
	None	1292.6	1446.1	11.2		
Red Bull	Spray	708.8	770.0	9.1	36.7	32.5%
	None	552.0	552.0	0.0		
Granero	Spray	1396.0	1446.1	3.6	1.6	20.0%
	None	1008.4	1446.1	42.5		
Cometa	None	1352.4	1446.1	6.2	16.5	17.4%
Gunnison	None	1352.4	1446.1	6.2	16.0	27.8%
Mesquite (X-2)	None	1352.4	1446.1	6.2	0.2	(-1.5)%
OLYS 05-N5	None	1352.4	1446.1	6.2	9.0	14.7%
Arcero	Spray	1030.0	1347.0	30.7	0.6	10.5%
	None	1023.6	1117.3	9.1	20.5	



PESTS

Introduction of Pesticides



Onion Thrip Control

Arkansas Valley Branch Station
Rocky Ford, Colorado

Frank C. Schweissing¹

Colorado

— * —

Agricultural
Experiment
Station

PROGRESS REPORT

COLORADO STATE UNIVERSITY • FORT COLLINS

PR 141

September, 1964

TABLE 1 — AVERAGE ONION YIELDS PER ACRE — INSECTICIDE TRIALS FOR ONION THRIP CONTROL
Arkansas Valley Branch Station, Rocky Ford, Colorado, 1962

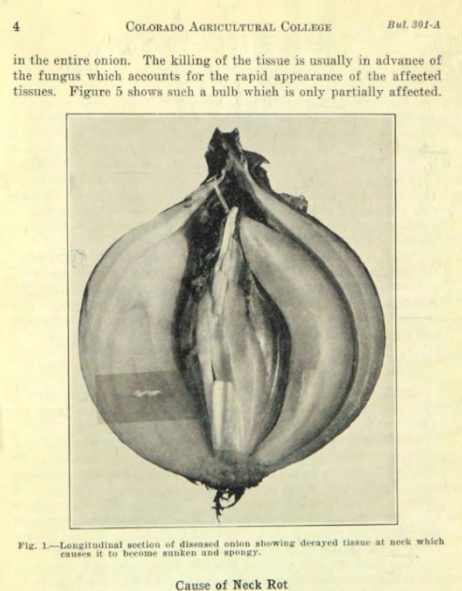
Treatment	Toxicant (Pounds/Acre Application)	Total Salable Onions	Onion Yields (50-lb. Bags)	
			Jumbos 3"	Commercials 2-3"
Toxaphene E.C.	2.0	516.8	391.2	125.6
plus Parathion E.C. . . . .	.25			
Dieldrin E.C. . . . .	.5	495.6	378.4	117.2
plus Parathion E.C. . . . .	.25			
Parathion D. . . . .	.5	493.2	359.6	133.6
Parathion E.C. . . . .	.25	460.4	356.4	104.4
Dieldrin E.C. . . . .	.5	456.4	354.4	102.0
Toxaphene E.C.	2.0	454.8	332.8	122.0
DDT E.C.	1.0	441.6	323.6	118.0
Diazinon E.C. . . . .	.5	423.2	317.2	106.0
Diazinon D.	1.0	415.6	318.0	97.6
DDT D.	1.0	407.6	291.2	116.4
Check		341.2	252.0	89.2
L.S.D. at .05		59.6	41.6	25.6

Integrated Pest Management



Treatment Program	Date of Application					
	June 13	June 21	June 28	July 5	July 13	July 20
1. Control	-	-	-	-	-	-
2.	Movento at 5 fl oz/a	Movento at 5 fl oz/a	Lannate LV 1.5 pts/a	Torac 15EC 24 fl oz/a	Lannate LV 1.5 pts/a	Torac 15EC 24 fl oz/a
3.	Movento at 5 fl oz/a	Movento at 5 fl oz/a	Lannate LV 1.5 pts/a	Lannate LV 1.5 pts/a	Torac 15EC 24 fl oz/a	Torac 15EC 24 fl oz/a
4.	Movento at 5 fl oz/a	Movento at 5 fl oz/a	Radiant SC at 8 fl oz/a	Torac 15EC 24 fl oz/a	Radiant SC at 8 fl oz/a	Torac 15EC 24 fl oz/a
5.	Movento at 5 fl oz/a	Movento at 5 fl oz/a	Radiant SC at 8 fl oz/a	Lannate LV 1.5 pts/a	Radiant SC at 8 fl oz/a	Lannate LV 1.5 pts/a

Onion Diseases





Onion Weed Control



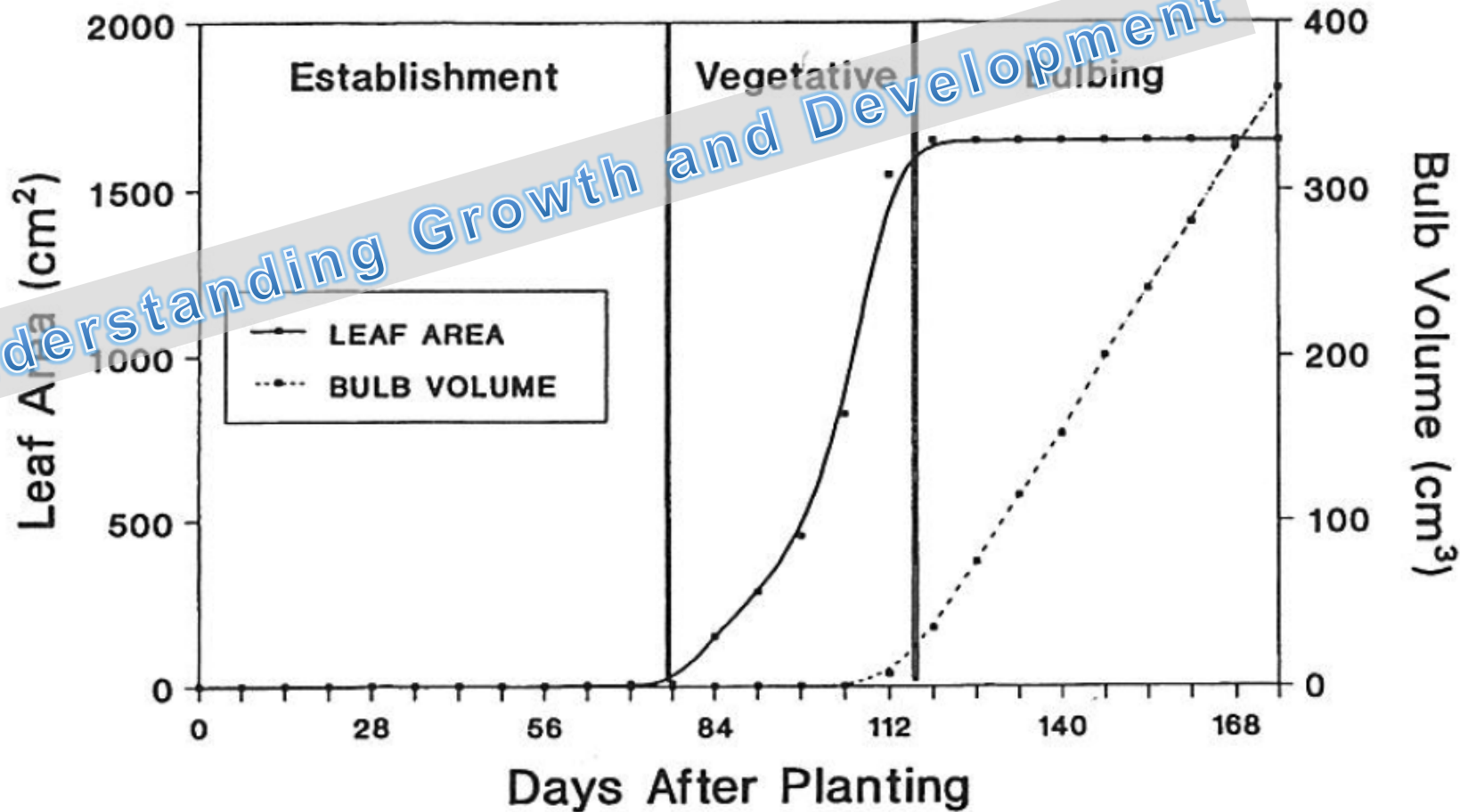
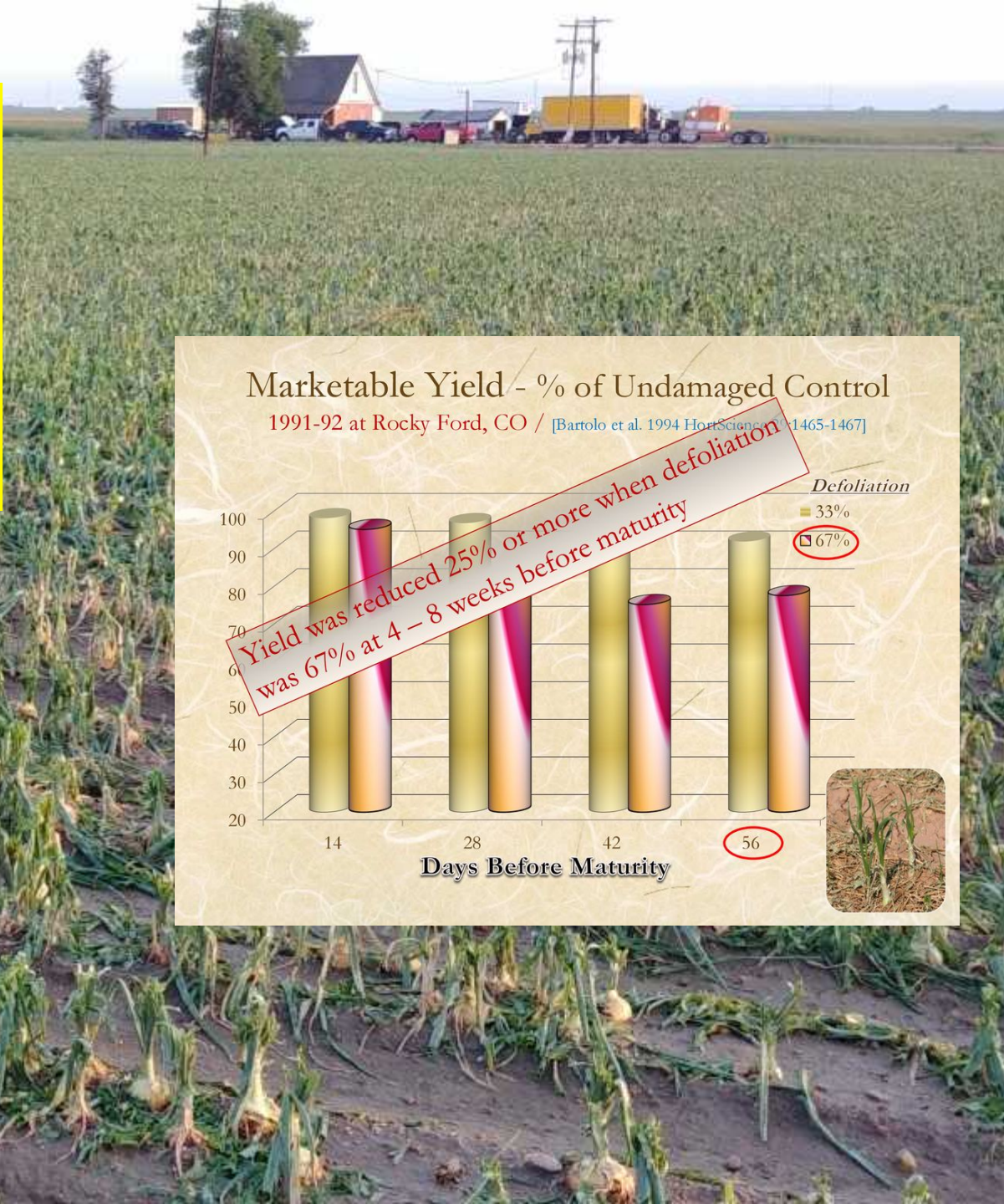


Figure 2: Developmental stages of seeded variety 'Colorado 6' at Rocky Ford, CO (courtesy of M. E. Bartolo).





Marketable Yield - % of Undamaged Control

1991-92 at Rocky Ford, CO / [Bartolo et al. 1994 HortScience 1465-1467]



COLORADO ONION PRODUCTION • INTEGRATED PEST MANAGEMENT

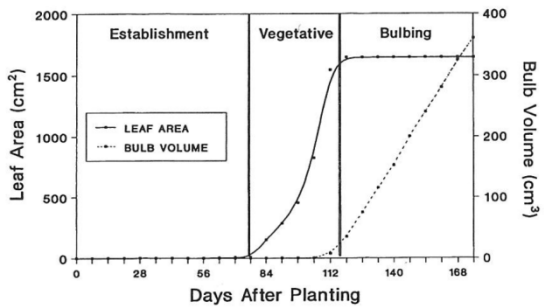


Figure 2: Developmental stages of seeded variety 'Colorado 6' at Rocky Ford, CO (courtesy of M. E. Bartolo).

Effect of Soil Salinity On Relative Onion Yield

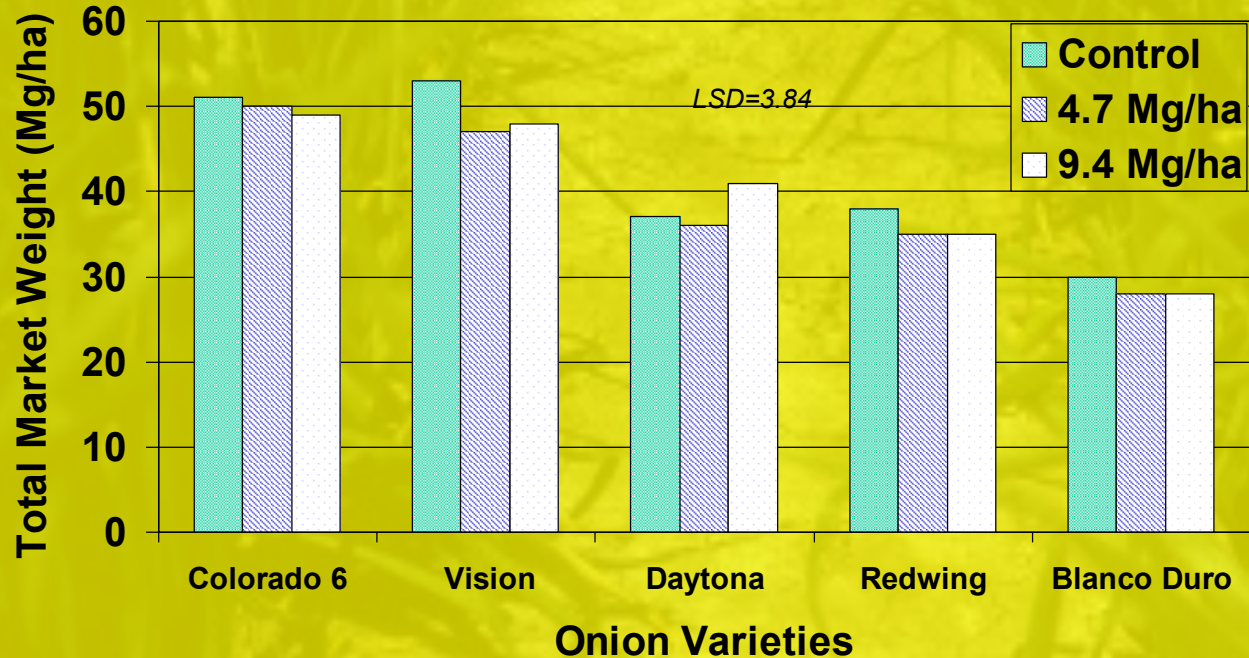


Figure 1. Mean total Market weight (colossal, jumbo, medium, and prepack) for five onion varieties over all treatments in the variety-salinity field trial. Mean separation by LSD ($p \leq 0.05$)

Planting, Bed Configuration and Population



Production Practices



Transplanting

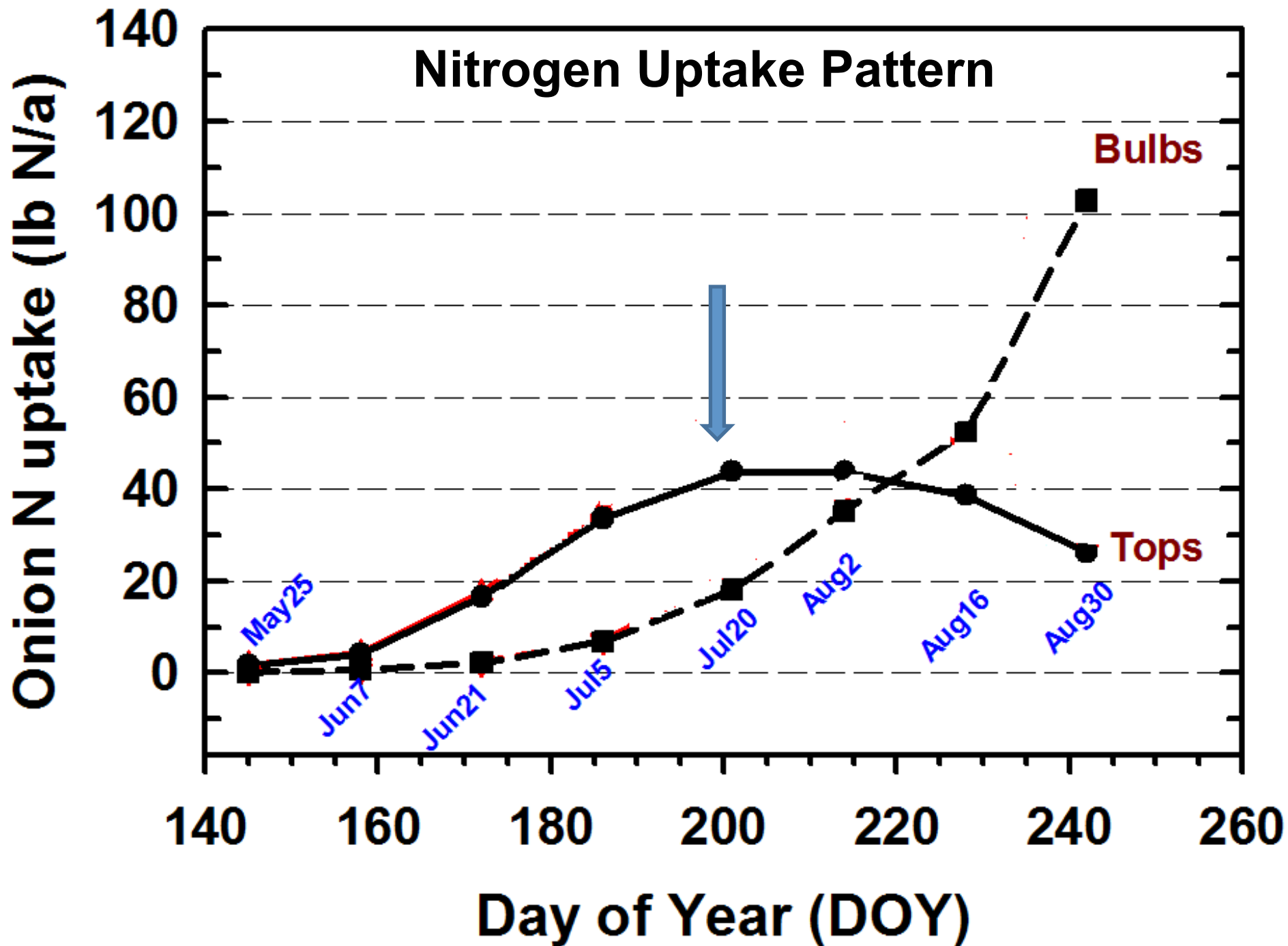


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Fertility

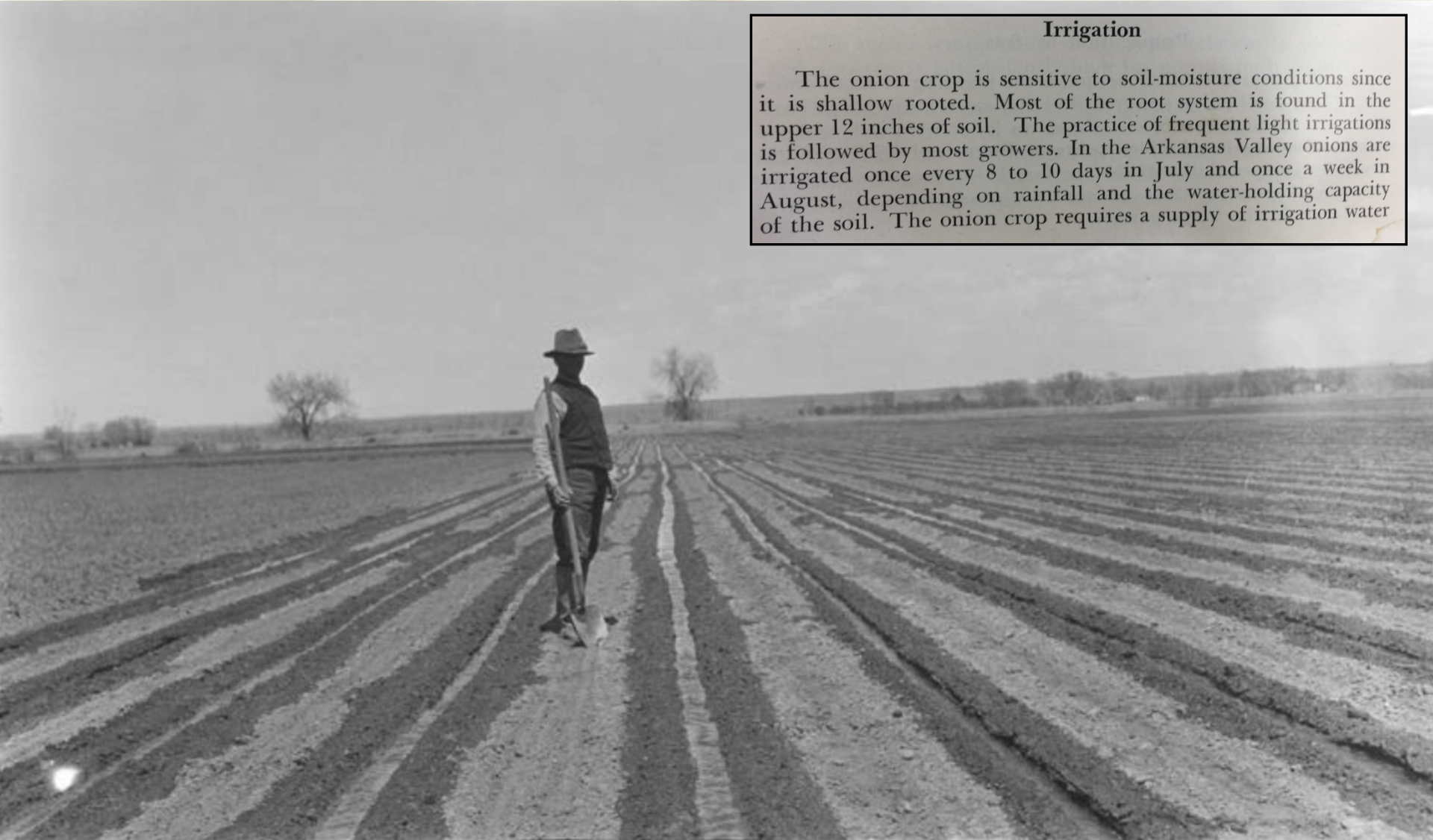




Irrigation

Irrigation

The onion crop is sensitive to soil-moisture conditions since it is shallow rooted. Most of the root system is found in the upper 12 inches of soil. The practice of frequent light irrigations is followed by most growers. In the Arkansas Valley onions are irrigated once every 8 to 10 days in July and once a week in August, depending on rainfall and the water-holding capacity of the soil. The onion crop requires a supply of irrigation water

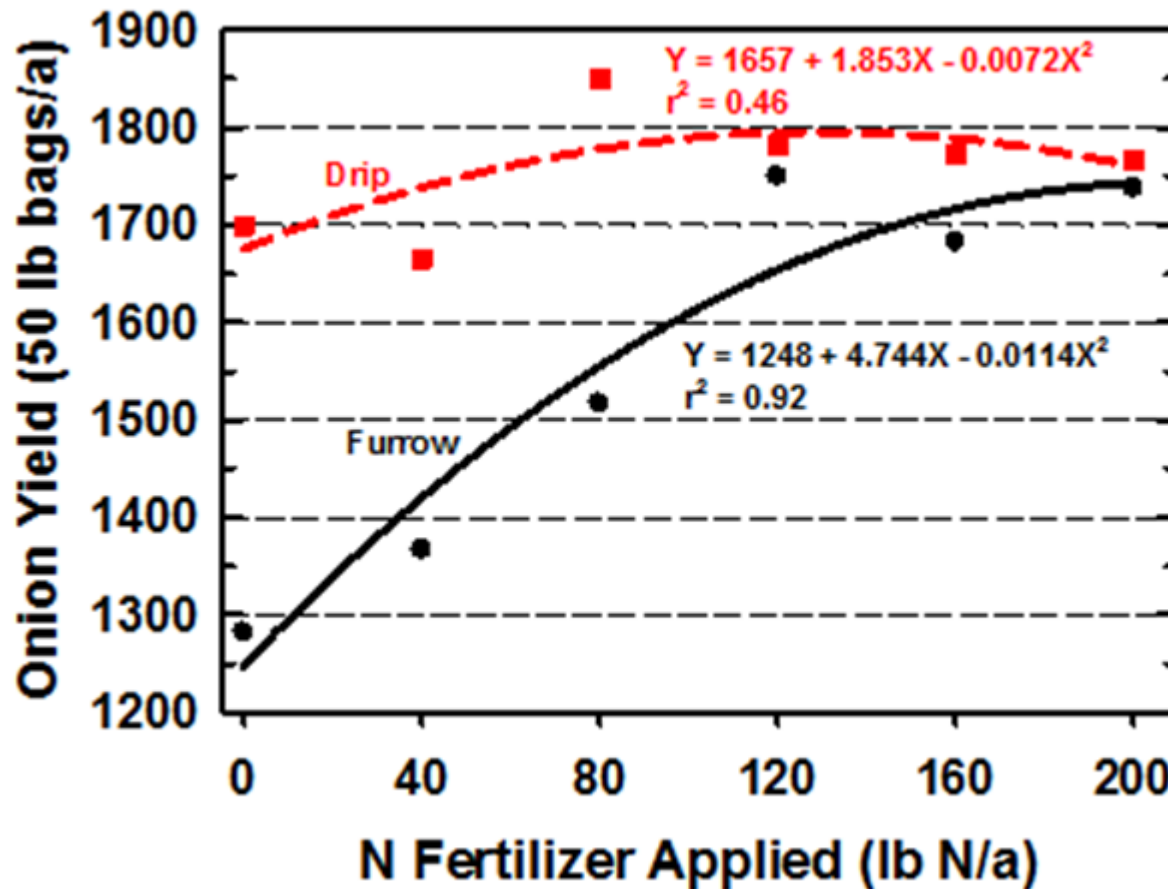






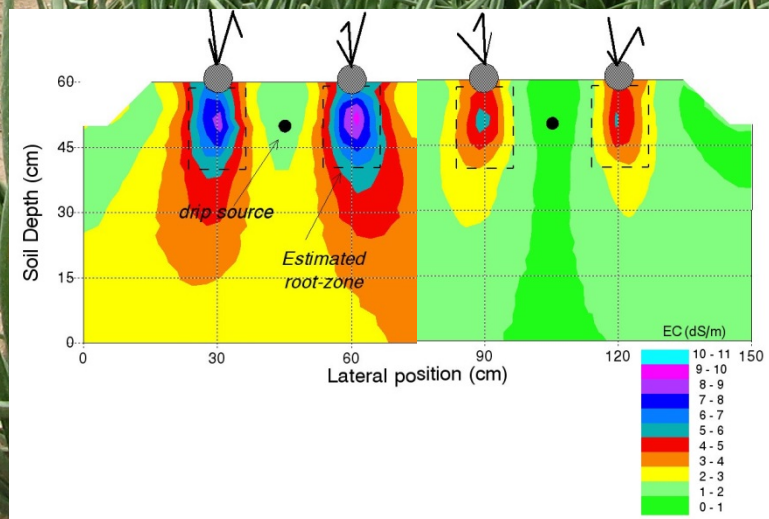
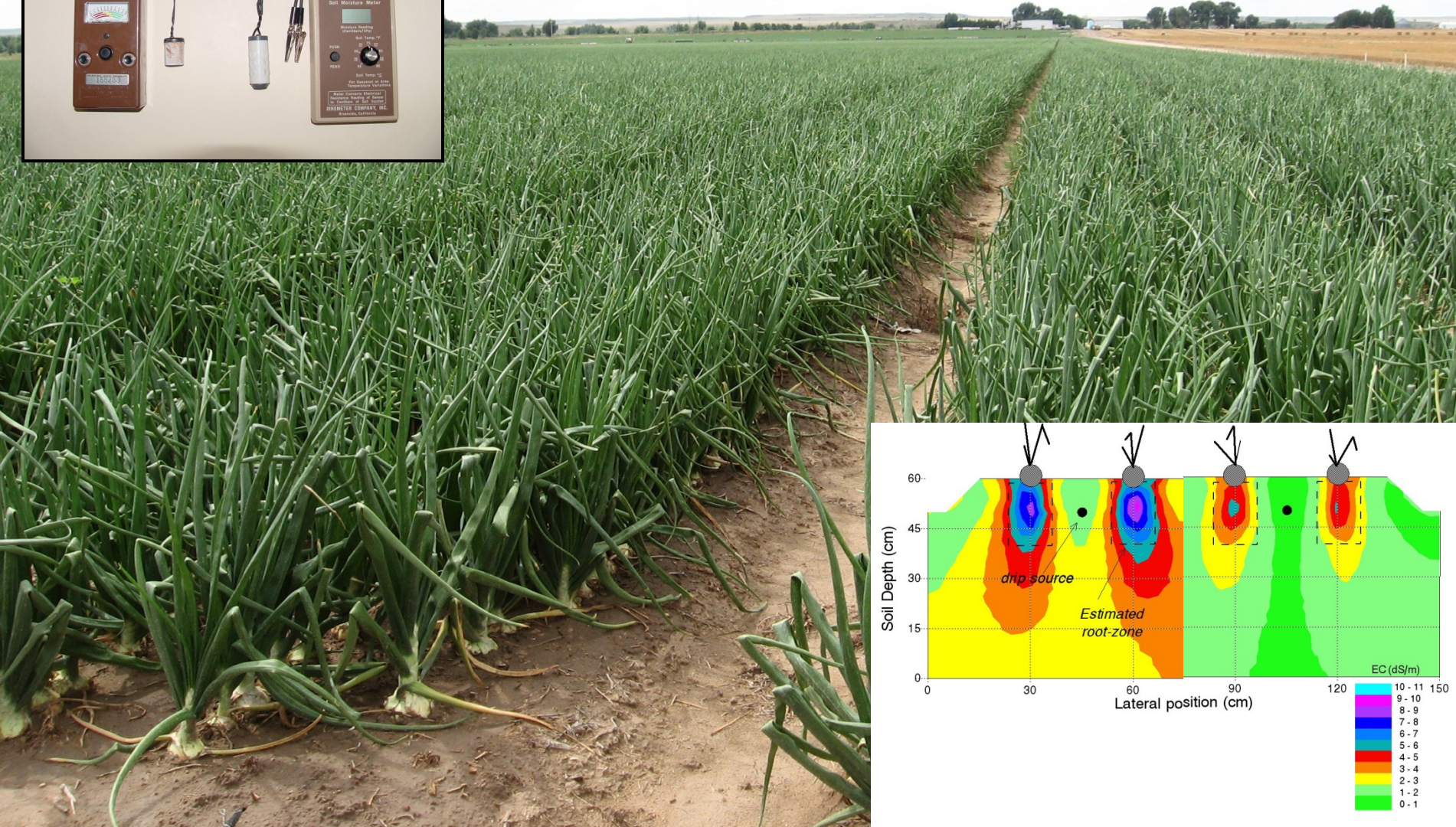
Introduction of Drip

Onion Yield as a Function of Nitrogen Fertilizer Rate and Irrigation System



Halvorson, A. D., M. E. Bartolo, C. A. Reule, and A. Berrada. 2008. Nitrogen Effects on Onion Yield Under Drip and Furrow Irrigation. *Agron. J.* 100:1062-1069.

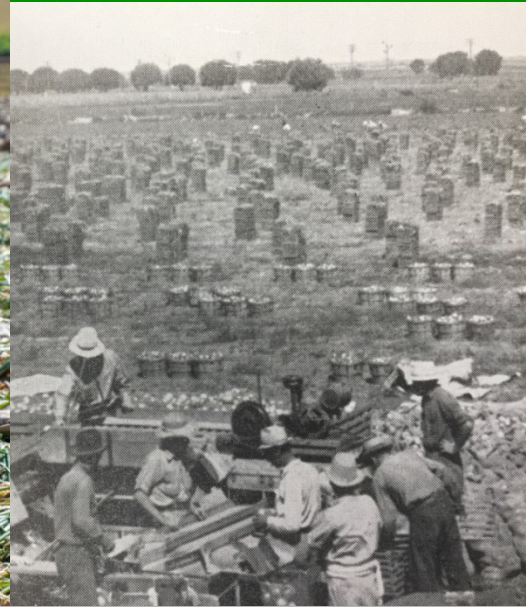
10-25% Increase in Yield





Onion Harvest





Onion Harvest and Storage



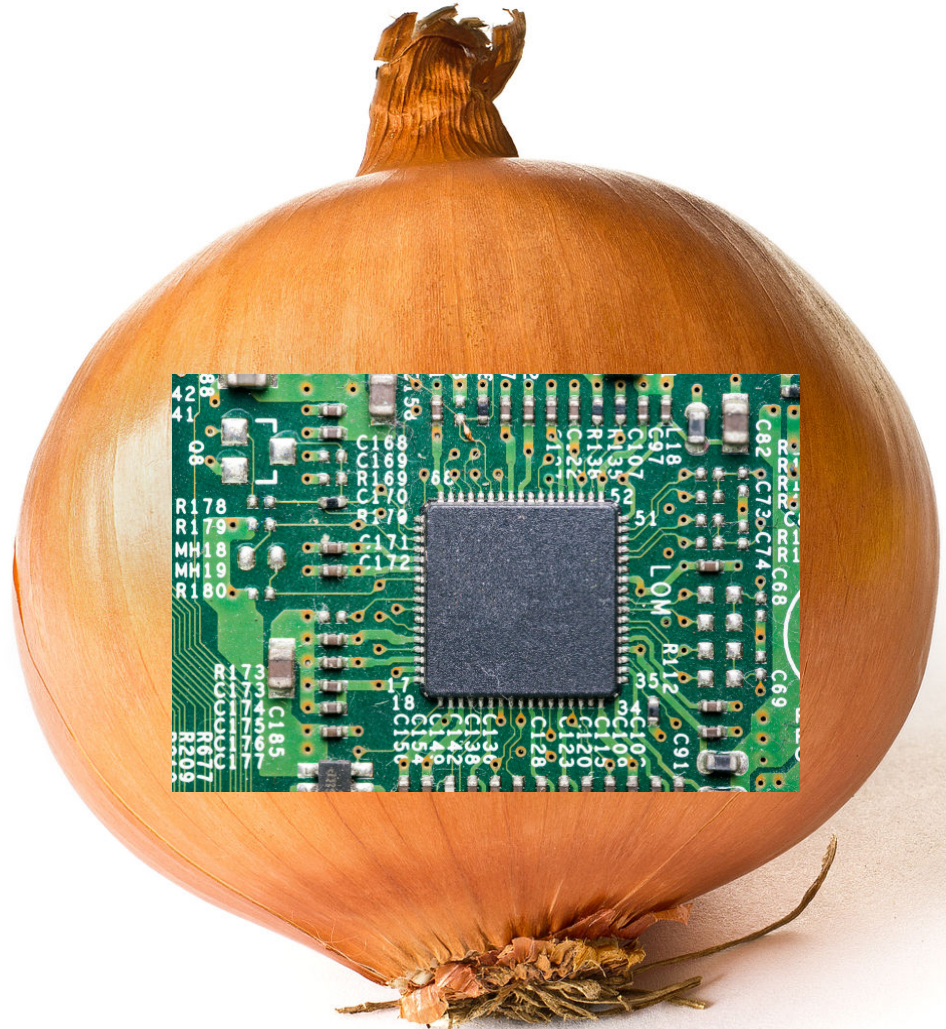
Technological Advances



to S
OF AG

Future: What's next?

- Soil Health
- Data- Sensors
- Genetics for
Pests
Human Health



Questions

Thanks

CSU Libraries

Dr. Howard Schwartz

Dr. Whitney Cranshaw

