1. Field Demonstration Site Summaries

a. Colorado demonstration sites

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Introduction

Three counties, Baca, Prowers, and Weld, each with a conventional and diversified grower, were sampled for the 2003-2004 Colorado AWPM season. Figure 1 shows the counties in Colorado, with the AWPM counties circled in red, and Table 1 describes the county, rotation, and grower. In addition to the W-M-F rotation for Stan Grower #55, sunflower was sampled. The sunflower is part of a W-W-S-C-Sunf.-F rotation and was included as an additional sampling of interest.

Sampling commenced in late August and continued until October, 2004. The fields were mapped with GPS coordinates using an HP IPAQ 2215 Pocket PC. Soil samples were taken prior to planting for an assessment of soil fertility and available soil water. Wheat fields were sampled for volunteer wheat and weeds before planting, and then sampled for pests, natural enemies, and weeds following planting. For sorghum, sunflower, and millet, pests and natural enemies were sampled. Weather stations were set up adjacent to all field sites to measure temperature and precipitation. Sampling was discontinued for grower #50's wheat on May 20, 2004 due to crop failure. The results of this season are organized by county and crop.

Table 1. Counties, rotations, and growers for the 2003-2004 Colorado growing season, AWPM.

County	Rotation	Cooperator
Baca	W-F	Grower #52
Baca	W-Sunf.-F	Grower #53
Prowers	W-F	Grower #51
Prowers	W-S-F	Grower #50
Weld	W-F	Grower #283
Weld	W-M-F	Grower #55

Materials and Methods

Soil Sampling

Each field (both wheat and alternative crops) was divided up into four benchmark areas, which represented the major variation in soil conditions (i.e. soil type/slope) in the field. At these benchmarks, 0-4 inch soil samples are taken prior to planting and analyzed for pH, organic matter, N, P, K, and Zn. Also, a hydraulic soil sampler was used to sample available soil water in one-foot increments down to six feet.

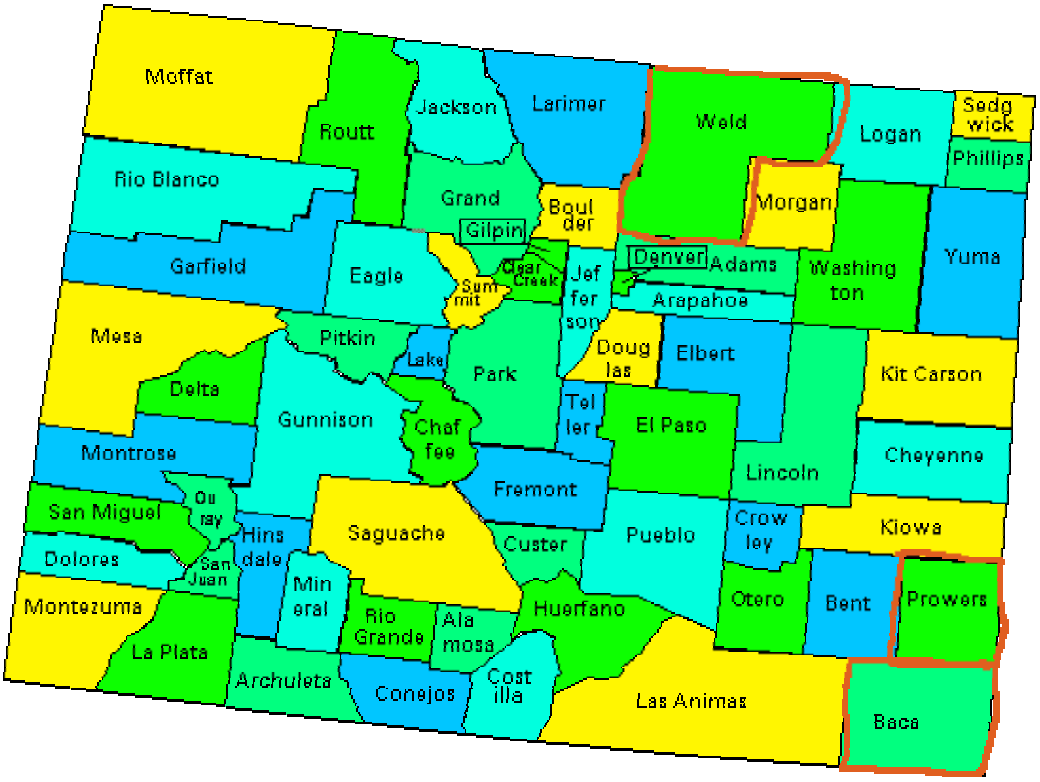

Figure 1. Colorado counties. AWPM counties are circled in red.

Wheat

Wheat fields were divided into a grid of 25 uniformly sized cells, distributed to provide good coverage of the field. Winter wheat sampling began two weeks before planting and continued until two weeks following harvest. Sampling was conducted for aphids, parasitoids, natural enemies, and other pests. Aphids were sampled once in October and again in the spring. Twenty-five one-foot rows were taken once per month at each site and extracted using Berlese funnels. Aphids were also sampled by collecting four tillers at each of the 25 points biweekly. Predators were sampled visually in a two-row foot area biweekly, and, when the wheat was tall enough, 25 sweep net samples were taken along with the visual sample at each point. Weeds were also sampled at the same 25 grid sampling points in the field as for insects. In addition, the field border area was surveyed for the presence or absence of grasses serving as aphid hosts. Once in October or November, a wheat sample was taken to identify the presence of wheat curl mites. The Hessian fly is not a potential pest in Colorado, thus sampling was not necessary. In spring, the number of sawflies in the routine sweepnet samples for predators was counted, and, if populations of adults were seen during boot through early heading, a 100-tiller sample was taken from across the field to determine the larval infestation level. Significant disease incidence would likely be low, but diseases would be reported if found. Surveys and coinciding survey times are displayed below in Table 2.

Table 2. Surveys and survey times for sampling in winter wheat.

Surveys	**Survey Times**
In-field weed sampling	Pre-plant, post-plant, 0-14 days before jointing, 0-14 days before harvest, 0-14 days after harvest
Field border weed sampling	Pre-plant, 0-14 days after harvest
Volunteer wheat (for aphids and mites)	Pre-plant
Berleses (aphid counts)	Post-plant, 1x/month in spring
Aphid tiller	Post-plant, biweekly in spring
2-row foot predator	Post-plant, biweekly in spring
Predator sweeps	Biweekly in spring (when wheat is tall enough)

Sorghum

In sorghum, monitoring was conducted during the following times: late whorl, flowering, and grain fill, starting in early August. If aphid populations were to become significant, sampling would be conducted more frequently. Data collection consisted of samples to determine aphid and beneficial insect abundance and samples taken once during flowering through grain filling for headworm infestations. Sampling with the IPAQ handheld computer was accomplished at 10 locations, which were chosen to give good coverage of the field. At each of the 10 locations, 50 plants were visually sampled for beneficial insects. For aphids, three plant samples were taken at each location (beginning, middle, and end of the row) to estimate aphid abundance. Each plant was cut off at the soil level. Aphids were counted inside the individual leaves and whorl of the plants. The infestation level of banks grass mite should be determined each time the field is sampled. Headworm samples are taken only one time during the sorghum growing season, after flowering.

Sunflower

Sunflower sampling was undertaken at four benchmark areas using several methods, and sampling commenced early August. Seed weevils were counted per head on 15 heads chosen at random in each of the benchmarks. Counting started at late bud stage (R-4.0) and stopped when the majority of the plants had passed 70% pollen shed (R-5.7). Also, the head clipper weevil was surveyed, counting the number of cut plants in 50 row foot in each of the four benchmark areas. The head moth was surveyed two weeks after plants reach the 5.9 stage. Heads were removed from 15 plants chosen at random from the four benchmark areas. Sunflower stem weevils and stem borers were counted at plant maturity. Fifteen stalks were randomly chosen at each of the four benchmark areas, the stalks were split, and the number of weevil and stem borer larvae were counted.

Millet

One sampling to determine the presence of cereal aphids and possible natural enemies was done in late summer (late August). Twenty-five one-foot row plant samples were randomly taken throughout the field to determine insect and mite density, extracted with Berlese funnels. Predators were sampled by visually inspecting 25 one-foot rows across the field.

Weather

Weather stations were stationed near benchmark areas at each field site. Temperature and rainfall were measured every 15 minutes, downloaded at least once a month, and recorded for each cooperator.

Results

Baca County-Grower #52 (W-F) and #53 (W-Sunf.-F)

Aphids

Aphids were sampled once in October and again from February through June. Table 3 shows *D. noxia*, *S. graminum, R. padi*, and *R. maidis* densities for each grower. *Rhopalosiphum maidis* was present in October following planting for both cooperators, and a few *R. maidis* were sampled in February. *Rhopalosipum padi* was present at both sites in October, increased in February, and declined later in the spring. In March, *S. graminum* was the most abundant aphid at both sites. *Diuraphis noxia* densities increased for Grower #53 and Grower #52 in April and again substantially in May and June. Total aphid densities were higher at Grower #52's site at each sampling date with densities at least doubling those at Grower #53's site.

Table 3. Aphids for Baca County cooperators, Grower #52 and Grower #53, in wheat. Total # aphids=sum of aphids for 25, 1-ft rows, extracted by Berlese funnels.

Date	Aphid		Grower #52	Grower #53
15 October 2003 (Post-Planting)	*D. noxia*		0	0
	S. graminum		19	1
	R. padi		3	1
	R. maidis		82	5
		Total	**104**	**7**
25 February 2004	*D. noxia*		9	5
	S. graminum		9	10
	R. padi		55	16
	R. maidis		10	16
		Total	**83**	**47**
17 March 2004	*D. noxia*		4	1
	S. graminum		37	5
	R. padi		4	0
	R. maidis		1	1
		Total	**46**	**7**
16 April 2004	*D. noxia*		56	6
	S. graminum		5	3
	R. padi		1	2
	R. maidis		0	0
		Total	**62**	**11**
20 May 2004	*D. noxia*		553	161
	S. graminum		7	3
	R. padi		0	1
	R. maidis		0	0
		Total	**560**	**165**
17 June 2004	*D. noxia*		2656	1041
	S. graminum		0	0
	R. padi		0	2
	R. maidis		0	0
		Total	**2656**	**1043**

Aphid densities from biweekly tiller sampling are displayed in Table 4. *Diuraphis noxia* peaked on June 3, 2004 for both cooperators. Both *D. noxia* and *S. graminum* populations were highest at each date for Grower #52, which mimicked the densities retrieved from Berlese extractions.

Table 4. Total aphids per 100 tillers collected biweekly for each cooperator.

	S. graminum		*D. noxia*	
	Grower #52	*Grower #53*	*Grower #52*	*Grower #53*
17 March 2004	7	4	0	0
2 April 2004	29	2	20	3
16 April 2004	0	0	0	0
7 May 2004	0	0	22	5
20 May 2004	0	0	119	31
3 June 2004	19	0	1753	631
17 June 2004	0	0	1	0

Predators

For the diversified and conventional farmers, natural enemies were prevalent in wheat. Table 5 shows the major predators present in wheat from May 20 through June 16, 2004. Natural enemy densities were relatively consistent between cooperators. The most abundant natural enemy for both cooperators was the spider, which was prevalent at all sweepnet sampling dates. Coccinellids and nabids were also abundant. Grower #52 had a greater density of the minute pirate bug, *Orius* sp. Lacewings and immature coccinellids were present but at low densities, which was also true for the immature coccinellids. Wheat stem sawflies were not found in any of the

sweepnet samples. Also, no parasitoids were found in any of the infested wheat tillers that were placed in the emergence canisters. Predator densities from visual biweekly samples included spiders, coccinellids, and minute pirate bugs for both cooperators.

Table 5. Predators in wheat for Grower #52 and Grower #53. Each date represents a total for 625 sweepnet samples per site (at 25 points).

	Nabidae		Spiders (Aranae)		Coccinellidae		Coccinellidae (imm.)		Lacewing (Chrysopidae)		Minute Pirate Bug	
Date	*Grower #52*	*Grower #53*	*Grower #52*	*Grower #53*	*Grower #52*	*Grower #53*	*Grower #52*	*Grower #53*	*Grower #52*	*Grower #53*	*Grower #52*	*Grower #53*
20 May 2004	29	17	178	195	28	12	1	0	1	2	22	5
3 June 2004	1	25	36	59	9	19	0	0	1	0	3	0
16 June 2004	5	9	37	32	7	3	0	0	1	1	5	0

Other Pests

In addition to aphids, two pests commonly found in Colorado AWPM sites are the brown wheat mite and cutworm. Table 6 shows cutworm and brown wheat mite densities for February through April. Brown wheat mite populations were present at both sites, with densities peaking on April 2. Populations declined following the last April sampling. Cutworms were also present March through April, biweekly, in low densities. Wheat curl mites were also sampled but were not abundant in late October/early November at any of the sites.

Table 6. Other pests present during biweekly 2-row foot predator samples at both Grower #52 and Grower #53 sites.

	Brown wheat mite		Army cutworm	
	Grower #52	*Grower #53*	*Grower #52*	*Grower #53*
25 February 2004	0	21	0	0
17 March 2004	105	0	0	3
2 April 2004	121	109	0	4
16 April 2004	28	2	1	4

Weeds

Prior to planting, jointed goatgrass and *Bromus* sp. were present along the borders at both sites but in very low densities. Following planting, bindweed densities were high on June 17, 2004, two weeks prior to harvest, and lambsquarter densities were high on July 12, 2004, two weeks following harvest, for Grower #52. Grower #53 followed a similar weed density (same species) on the same dates in addition to a high density of pigweed on July 12. Kochia, and Russian thistle densities were very high on July 12 for both cooperators.

Sunflower

Sunflowers were sampled August through September for seed weevils, headclipper weevils, sunflower head moths, stem weevils, and stem borers (Table 7). Seed and headclipper weevils were sampled on August 11 and 26, and densities were very low. Headmoth larvae were sampled on August 26, with few larvae present in the 60 heads sampled. Stem weevils and borers were sampled in October.

Table 7. Insects sampled for sunflower for Grower #53 in 2004, totaled over 60 sunflower plants at each date.

	Seed weevil	Headclipper weevil	Sunflower head moth	Stem weevil	Stem borer
11 August 2004	2	0	0	0	0
26 August 2004	0	0	24	0	0
27 October 2004	0	0	0	1	6

Prowers County-Grower #51 (W-F) and Grower #50 (W-Sorghum-F)

Wheat

Aphids

Aphids were sampled in October, following planting, and again in February through June. Table 8 shows *D. noxia*, *R. padi*, and *S. graminum* and their densities for each grower. For Grower #51, *R. maidis* was the most abundant aphid in October, and *D. noxia*, *S. graminum*, and *R. padi* were also present. *Diuraphis noxia* and *S. graminum* were present in March and April, and *D. noxia* was the dominant aphid in May and June. In Grower #50's field, *D. noxia* was present in March and April, and *S. graminum* was also present in April. Because Grower #50's wheat failed, it is difficult to compare aphid densities between cooperators.

Table 8. Aphids for Prowers cooperators, Grower #51 and Grower #50, in wheat. Total # aphids=sum of aphids for 25, 1-ft rows, extracted by Berlese funnels. **=crop failure, no sampling.

Date	Aphid	Grower #51	Grower #50
15 October 2003 (Post-Planting)	*D. noxia*	2	0
	S. graminum	6	0
	R. padi	3	0
	R. maidis	52	0
	Total	**63**	**0**
8 March 2004	*D. noxia*	0	13
	S. graminum	0	0
	R. padi	0	0
	R. maidis	0	0
	Total	**0**	**13**
15 April 2004	*D. noxia*	16	42
	S. graminum	23	7
	R. padi	5	1
	R. maidis	0	0
	Total	**44**	**50**
20 May 2004	*D. noxia*	606	**
	S. graminum	1	**
	R. padi	0	**
	R. maidis	0	**
	Total	**607**	
16 June 2004	*D. noxia*	518	**
	S. graminum	0	**
	R. padi	5	**
	R. maidis	0	**
	Total	**523**	

Aphids densities from biweekly tiller sampling are displayed in Table 9. Both *S. graminum* and *D. noxia* were present at all biweekly sampling dates in the spring, with the exception of March 16. Aphid densities were low for both species.

Table 9. Total aphids per 100 tillers collected biweekly at each date for each cooperator. **=crop failure, no sampling.

	S. graminum		*D. noxia*	
	Grower #51	*Grower #50*	*Grower #51*	*Grower #50*
16 March 2004	0	0	0	0
31 March 2004	5	0	5	0
15 April 2004	0	26	0	11
5 May 2004	0	6	0	5
20 May 2004	1	0	1	0
3 June 2004	0	**	0	**
16 June 2004	0	**	0	**

Predators

There were no apparent differences in natural enemy densities between cooperators. Table 10 shows the major predators for wheat from May 20 through June 16, 2004. Spider densities were high in late May for Grower #51 and Grower #50. Coccinellids increased the beginning of June. Lacewings, nabids and minute pirate bug populations were present but at very low densities. Predator densities from visual biweekly samples included spiders, coccinellids, and minute pirate bugs for both cooperators at minimal densities.

Table 10. Predators in wheat for Grower #51 and Grower #50. Each date represents a total of 625 sweepnet samples per site (at 25 points). **=crop failure, no sampling.

	Nabidae		**Spiders (Aranae)**		**Coccinellidae**		**Coccinellidae (imm.)**		**Lacewing (Chrysopidae)**		**Minute Pirate Bug**	
Date	*Grower #51*	*Grower #50*	*Grower #51*	*Grower #50*	*Grower #51*	*Grower #50*	*Grower #51*	*Grower #50*	*Grower #51*	*Grower #50*	*Grower #51*	*Grower #50*
20 May 2004	13	1	80	63	57	5	7	0	5	0	9	0
3 June 2004	12	**	79	**	141	**	15	**	3	**	3	**
16 June 2004	0	**	6	**	12	**	12	**	2	**	0	**

Other Pests

Table 11 presents the density of brown wheat mites and army cutworms present in biweekly samples March 16 through May 5, 2004. Brown wheat mite populations were high for both cooperators for March through April 15, 2004, especially for Grower #51. Densities of brown wheat mite peaked on March 31 at Grower #51's field at 2886 mites and similarly for Grower #50 at 1467. Populations declined following the last April sampling. Army cutworms were found at both sites April 15 and May 5, but densities were minimal.

Table 11. Other pests present during biweekly 2-row foot predator samples at both Grower #51 and Grower #50 sites, March 16-May 25, 2004.

	Brown wheat mites		Army cutworms	
	Grower #51	*Grower #50*	*Grower #51*	*Grower #50*
16 March 2004	1155	1467	0	0
31 March 2004	2886	818	0	0
15 April 2004	812	22	5	12
5 May 2004	0	0	3	7

Weeds

Weed field borders did not contain any grasses of significance for either cooperator prior to planting. For Grower #51, crested wheatgrass densities were high within the field two weeks prior to harvest. Bindweed was also present at this time but was minimal. Following harvest, lambsquarter was abundant within Grower #51's field, and grasses were not present along the field borders. Within-field weed sampling was not conducted for Grower #50 two weeks before or after harvest nor was the field border sampled for grasses following harvest due to the crop failure. Kochia and Russian thistle were very dense after harvest for both sites.

Sorghum

Sorghum was sampled three times at Grower #50's site, and Table 12 below displays predator and pest densities for the 10 benchmark areas sampled. *Rhopalosiphum maidis*, was the most abundant aphid, with densities peaking at 1300 at the late whorl stage. *Schizaphis graminum* was not present during the three sampling periods. Coccinellids and minute pirate bugs were the most abundant predators. Spiders, nabids, and lacewings were present, but their densities were minimal. Banks grass mite was not present. Sandburs were very dense in late August through October in the field.

Table 12. Predators and pests of sorghum at Grower #50's field during late whorl, flowering, and grainfill. Data represent predator totals of 10 benchmark areas for each date.

		R. maidis	Nabidae	Spider (Aranae)	Coccinellidae	Lacewing (Chrysoptera)	Minute Pirate Bug
Late Whorl	16 August 2004	1300	2	5	44	0	4
Flowering	8 September 2004	1194	0	0	9	5	29
Grainfill	27 October 2004	414	0	0	4	0	0

Weld County-Grower #283 (W-F) and Grower #55 (W-Millet-F and Sunflower)

Wheat

Aphids

Aphids were sampled once in October and again from March through June. Table 13 shows *D. noxia*, *R. padi*, and *S. graminum* and their densities for each grower. *Rhopalosiphum maidis* was present at Grower #283's site in October, and *D. noxia* was present at both sites in April. *Schizaphis graminum* was present for both cooperators in April, and densities increased in June for Grower #55. *Diuraphis noxia* densities increased significantly from May to June and remained high in July for both sites.

Table 14 shows the number of aphids per 100 tillers at each sampling date. *Diuraphis noxia* was consistently found in the 100 tillers from April through July.

Table 13. Aphids for Weld County cooperators, Grower #283 and Grower #55, in wheat. Total # aphids=sum of aphids for 25, 1-ft rows, extracted by Berlese funnels.

Date	**Aphid**		**Grower #283**	**Grower #55**
21 October 2003 (Post-Planting)	*D. noxia*		0	0
	S. graminum		0	0
	R. padi		0	0
	R. maidis		7	0
		Total	**7**	**0**
12 March 2004	*D. noxia*		0	1
	S. graminum		0	0
	R. padi		0	0
		Total	**0**	**1**
5 April 2004	*D. noxia*		15	3
	S. graminum		2	0
	R. padi		0	0
		Total	**17**	**3**
3 May 2004	*D. noxia*		46	16
	S. graminum		4	1
	R. padi		0	0
		Total	**50**	**17**
1 June 2004	*D. noxia*		1325	430
	S. graminum		0	66
	R. padi		0	7
		Total	**1325**	**503**
8 July 2004	*D. noxia*		1147	884
	S. graminum		0	0
	R. padi		0	0
		Total	**1147**	**884**

Table 14. Total aphids per 100 tillers collected biweekly at each date for each cooperator. **=no sample due to rain.

	S. graminum		*D. noxia*	
	Grower #283	Grower #55	Grower #283	Grower #55
12 March 2004	0	0	0	0
23 March 2004	0	0	0	0
8 April 2004	0	0	0	0
20 April 2004	0	0	80	**
3 May 2004	0	0	10	1
21 May 2004	0	0	24	4
1 June 2004	0	0	41	0
15 June 2004	0	0	133	21
8 July 2004	0	0	11	10

Predators

Table 15 shows the major predators for wheat from May 21 through July 8, 2004. The minute pirate bug was abundant on May 21 through June 1 for both cooperators, with densities at Grower #283's site doubling those of Grower#55's. When populations of minute pirate bugs decreased in mid June, coccinellids (adult and immature), nabids, and spiders were present. Grower #55 spider densities were double those of Grower #283 at each sampling date. Grower #283 had a greater density of immature and mature coccinellids from May through July. Lacewings were present in low densities at both sites. Predator densities from visual biweekly samples included spiders, and minute pirate bugs, carabids, and big eyed bugs, *Geocoris* sp., for both cooperators.

Table 15. Predators in wheat for Grower #283 and Grower #55. Each date represents a total for 625 sweep net samples per site (at 25 points).

	Nabidae		**Spiders (Aranae)**		**Coccinellidae**		**Coccinellidae (imm.)**		**Lacewing (Chrysopidae)**		**Minute Pirate Bug**	
Date	*Grower #283*	*Grower #55*	*Grower #283*	*Grower #55*	*Grower #283*	*Grower #55*	*Grower #283*	*Grower #55*	*Grower #283*	*Grower #55*	*Grower #283*	*Grower #55*
21 May 2004	28	51	20	67	10	7	1	0	2	1	714	309
1 June 2004	4	18	15	62	3	8	0	0	0	0	48	198
15 June 2004	38	34	25	57	59	10	77	1	4	2	35	30
8 July 2004	45	31	37	90	76	40	95	15	1	0	15	3

Other Pests

Table 16 presents the density of brown wheat mite and army cutworms present in biweekly samples March 12 through April 20, 2004. Brown wheat mites were present at both sites through March 23. Populations declined following the last April sampling. Cutworms were also abundant March through April, biweekly, at both sites.

Table 16. Other pests present during biweekly 2-row foot predator samples at both Grower #283 and Grower #55 sites March 16-May 25, 2004. **=no sample due to rain.

	Brown wheat mite		Army cutworm	
	Grower #283	*Grower #55*	*Grower #283*	*Grower #55*
12 March 2004	0	87	0	0
23 March 2004	80	64	0	0
8 April 2004	0	0	0	0
20 April 2004	0	**	0	**

Weeds

Before planting, jointed goatgrass, volunteer wheat, and *Bromus* sp. were present around Grower #283's field border, but their presence was minimal. *Bromus* sp. grasses were also present around Grower #55's field before planting but were minimal. For Grower #283, bindweed densities were moderate two weeks before and after harvest within the field, and pigweed was present before harvest. Crabgrass was dense in Grower #55's field two weeks before harvest. Field borders contained crested wheatgrass and *Bromus* sp. at low densities at both sites following harvest.

Millet

Millet was sampled once on September 1, 2004. After extracting 25, one-foot rows, with Berlese funnels, no aphids, mites, or other pests were present. After visual analysis of predators, five spiders were present in a total of 25, one-foot row predator checks.

Sunflower

Sunflowers were sampled August through September for seed weevils, heaclipper weevils, sunflower head moths, stem weevils, and stem borers (Table 17). Seed and headclipper weevils were sampled on August 10 and 16, and densities were very low. Headmoth larvae were sampled on September 1, with very few larvae present in the 60 heads sampled. Stem weevils and borers were sampled on September 28, and a significant number of stem weevils were present in the stems. Borers were also present at this time.

Table 17. Insects sampled for sunflower for Grower #53 for 2004 totaled over 60 sunflower plants.

	Seed weevils	Headclipper weevil	Sunflower head moth	Stem weevil	Stem borer
10 August 2004	9	6	0	0	0
16 August 2004	5	4	0	0	0
1 September 2004	0	0	2	0	0
28 September 2004	0	0	0	532	23

Weather

Table 18. Precipitation (in.) data for Sept. 2003-Sept. 2004 for all cooperators.

	Grower #283 (Briggsdale)	Grower #55 (Briggsdale)	Grower #53 (Springfield)	Grower #52 (Springfield)	Grower #51 (Lamar)	Grower #50 (Lamar)
September 2003	0.84	0.39	0.10	0.08	0.95	1.08
October 2003	0.00	0.00	0.00	0.00	0.00	0.00
November 2003	0.00	0.00	0.00	0.00	0.00	0.00
December 2003	0.02	0.00	0.00	0.06	0.00	0.00
January 2004	0.04	0.00	0.00	0.00	0.00	0.00
February 2004	0.00	0.02	0.00	0.00	0.01	0.50
March 2004	0.00	0.04	0.26	0.00	0.40	0.42
April 2004	0.00	0.00	3.67	0.00	3.33	0.72
May 2004	0.00	2.39	0.03	0.00	0.24	0.01
June 2004	1.39	1.78	5.81	0.00	3.44	4.32
July 2004	0.14	0.57	3.21	1.17	1.79	0.85
August 2004	0.59	0.60	3.72	0.00	0.09	0.82
September 2004	0.51	0.82	0.22	0.00	0.00	1.71
Sept-Sept	**3.53**	**6.61**	**17.02**	**1.31**	**10.25**	**10.43**

Summary

For wheat, several observations were made for the 2003-2004 season. There was an abundance of aphids for all cooperators, but Baca Co., in particular. Because of the new *D. noxia* biotype, it was interesting to observe an increase in aphid densities in comparison to the 2002-2003 season. At Grower #52's, the wheat was stunted and tillers were symptomatic. Aphid densities were over double those of Grower #53's, the diverse grower, at each date sampled. In Prowers Co., aphid densities were moderate for Grower #51's W-F rotation. For Grower #50, the wheat failed on May 20, making it difficult to compare aphid populations between growers. Weld Co. mimicked the results for Baca Co., with the W-F grower, Grower #283, maintaining at least double the *D. noxia* densities of Grower #55. Brown wheat mite densities were extremely high in Prowers Co. from March 16 through April 15 for both cooperators but for Grower #51 (W-F), in particular. Other pests, including cutworms, wheat curl mites, and wheat stem sawfly populations, were minimal. Predator populations were relatively consistent between diverse and conventional growers within each county. Weeds and alternative host grasses did not play a significant role within the field or along the field borders at any of the sites. Kochia and Russian thistle dominated the fields following harvest in all counties, which was most likely due to late season precipitation.

For the alternative crops, in Baca Co., sunflowers at Grower #53's had very few pests. Seed weevils, sunflower head moths, and stem weevils and borers were present but minimally. In Prowers Co., Grower #50's sorghum contained several *R. maidis*, low densities of predators, and no mite infestations. The field was infested with sandburs for flowering and grainfill samplings. In Weld Co., millet did not contain any pests and very few predators. The millet suffered from drought stress and appeared stunted. The sunflower benchmarks had seed and headclipper weevils, sunflower head moths, and stem weevils and borers. All insects were minimal, with the exception of stem weevils, which averaged about eight per stalk. The stems did not show a high percentage of damage. However, the sunflowers were stunted and lacked vigor early in the growing season, which is most likely due to drought conditions.

Precipitation was highest for the end of May and June at all sites, but precipitation was limited during the growing season for wheat. Precipitation was significantly greater for the alternative crops in Prowers and Baca counties, however, it was minimal for Weld Co. Both wheat and alternative crops in Weld Co. crops appeared drought stressed.

We continue to extend communications with all cooperators, and growers continue to take interest in the project. We send cooperators a copy of their soil surveys, and, along with these surveys, we send a note to give them a short update of when we will sample and the insects and pests we have encountered during our sampling. In addition, we plan to meet with cooperators during the winter season and give each a report of the 2003-2004 season results.