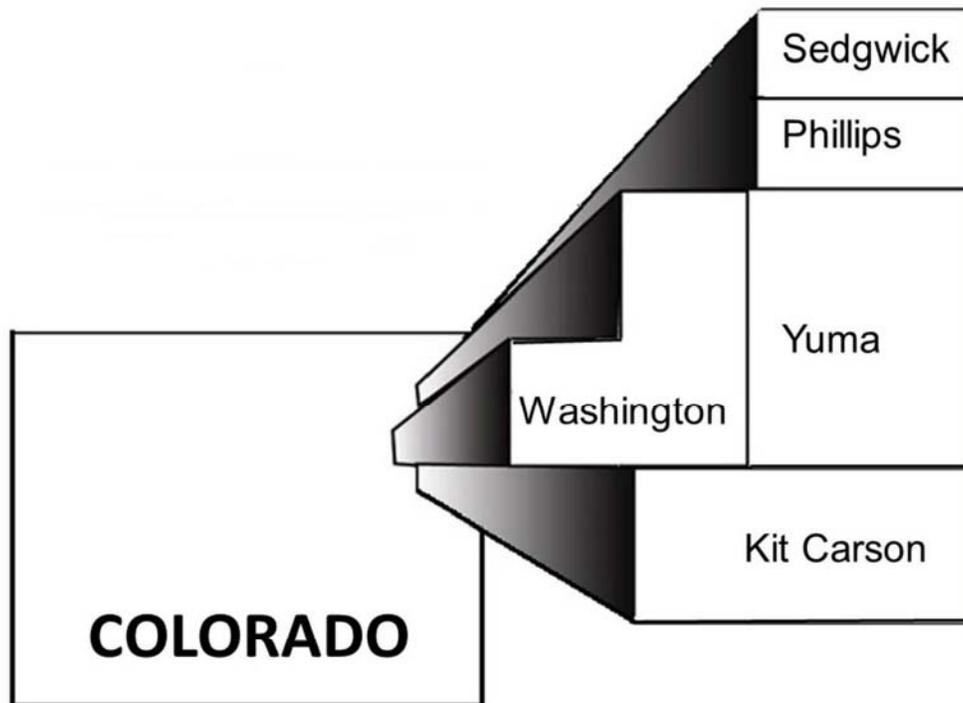


Golden Plains Area
AGRICULTURAL HANDBOOK



2018 | Volume XV
Part 1



GOLDEN PLAINS AREA
COLORADO STATE UNIVERSITY
EXTENSION

Colorado State University Extension

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Golden Plains Area

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PLANT SELECT® PROGRAM IN THE GOLDEN PLAINS AREA

*Linda Langelo, Horticultural Agent, Colorado State University Extension,
Colorado Master Gardeners Jessica Rodriguez and Ellen Figueroa*

Golden Plain Area Master Gardener™ Volunteer Demonstration Gardens

Golden Plains Area Master Gardener™ volunteers are fostering successful gardening by providing research-based information to area residents through Plant Select® demonstration gardens. Gardens are located at the Washington County Events Center in Akron and Phillips County Event Center. Other Plant Select® gardens are located in Julesburg at the Town Hall Office and Thompson Park.

Plant Select®

Plant Select® is a cooperative program administered by Denver Botanic Gardens and Colorado State University in collaboration with horticulturists and nurseries throughout the Rocky Mountain region and beyond. The purpose of Plant Select® is to locate, identify and distribute the very best plants for landscapes and gardens from the intermountain region to the high plains.

Several plants are chosen each year that thrive in the sunny, variable conditions of Rocky Mountain gardens. These can be plants that have grown here for years and have not yet attained the popularity they deserve, known as recommended plants. Introductions represent taxa that are discovered by our cooperators. Superior forms or hybrids carefully tested over time are known as originals. Plant Select® is at the vanguard of a bold, new plant palette that is revolu-

tionizing the way we garden. Here are plants that thrive in both our variable winters and our hot summers. These plants are helping to forge a truly American style of horticulture.

To determine which of the recommended plants do the best in Eastern Colorado, Master Gardener Volunteers in the Golden Plains Area record success and failures in area demonstration gardens. Volunteers replant the plant varieties that do not survive. After three successful years a plant variety will be recommended for planting in the Golden Plains Area. The plants listed in the following lists have successfully endured a three-year period or more.

There is also a listing of vegetable varieties that have been tried in our area community gardens. This list has been narrowed to the best selections which have performed well in the Golden Plains.

In addition, there is information on the continued results of the Earth-Kind® Rose Demonstration Garden, tree recommendations for the eastern plains based on site visit observations along with added suggestions based on Dr. Jim Klett's CSU nursery trial work, CSU Annual 2018 and Perennial Trials of 2018. The Perennial Trials is a two year trial.

Washington County Plant Select Garden

Colorado Master Gardener volunteers Jessica Rodriguez, Ellen Figueroa, and Rita Campbell planted at the Washington County Events Center in Akron, Colorado in June of 2004. Pea gravel is used for mulch on this garden.

*Turkish Veronica.....	Veronica liwanensis
Sunset Hyssop	Agastache rupestris
Colorado Gold™ Gazania.....	Gazania linearis
*Red Rocks™ Penstemon &	
Pikes Peak Purple™ Penstemon	Penstemon x mexicali & Penstemon x mexicali
Coral Canyon Twinspur	Diascia integerrima
*Prairie Jewel™ Penstemon	Penstemon grandiflorus
Sonoran Sunset Hyssop	Agastache cana ‘Sinning’
Snow Angel Coral Bells.....	Heuchera sanguine ‘Snow Angel’
Hopflower Oregano	Origanum libanoticum
Mojave Sage	Salvia pachyphylla
Snow Angel Coral Bells.....	Heuchera sanguine ‘Snow Angel’
La Veta Lace® Geranium.....	Geranium magniflorum
Corsican Violet	Viola Corsica
Ferman’s Red Sage.....	Salvia greggii
Wild Thing Sage	Salvia greggii
Mesa Verde® Ice Plant	Delasperma ‘Kelaidis’
Table Mountain® Ice Plant.....	Delasperma ‘John Proffitt’
Winecups	Callirhoe involucrata

All performed well except the Snow Angel Coral Bells and Corsican Violets. These plants prefer dry shade. They were chosen by a Colorado Master Gardener to see how they would perform with some shading of nearby plants. The Winecups have been growing steadily in this garden as the Hopflower Oregano. These plants continually are weeded out. The Penstemons reseed themselves and also need to be weeded.

In addition to the Washington County Event Center Garden, there is a new garden on the southwest corner with a windmill as a central feature. There are a handful of plants being trialed in this garden. The location

is open to high winds. There is a Tatarian Maple tree along with the Prairie Jewel Penstemon plants did well in the drought summer of 2012. Irises have been added along the outer edge of the garden to block some of the wind and suppress the weeds. In 2014 the Tatarian Maple was knocked by equipment. It seems to still be growing. In 2015, we had a tremendous amount of weeds because of the heavy spring rains and early summer rains. Additional gravel is planned to help suppress the weeds. In 2016 and 2017, this garden was well established and has a good mix of durable plants for our area.

Phillips County Event Center Plant Select Garden

Holyoke, Colorado started a Plant Select® Garden in 2010. The following is a list of plants found in the garden:

Acer tartarium ‘GarAnn’	Hot Wings® Tatarian Maple
Agastache cana ‘Sinning’	Sunset® Hyssop
Amsonia jonesii.....	Colorado Desert Bluestar
Arctostaphylos x coloradoensis.....	Panchito Manzanita
Buddleia Lo & Behold	Blue Chip
Calamagrostis brachytricha	Korean Feather Reed Grass
Callirhoe involucrate	Winecups
Ceratostigma plumbaginoides	Leadwort
Epilobium fleischeri.....	Alpine Willowherb
Erigonium umbellatum var. aureum ‘Psdowns’	Kannah Creek® Buckwheat
Hesperaloe parviflora.....	Red Yucca
Marrubium rotundifolium.....	Silver Horehound
Nepeta ‘Psfike’	Little Trudy® Catnip
Penstemon x Mexicali ‘Psmyers’	Red Rocks Penstemon
Philadelphus lewisii	Cheyenne® Mock Orange
Origanum vulgare	Oregano
Salvia daghestanica	Platinum® Sage
Veronica liwanensis.....	Turkish Veronica
Zauschneria garrettii	Orange Carpet® Hummingbird Trumpet

New Additions 2016/2017

Heterotheca jonesii.....	Creeping Golden Aster
Penstemon virens	Blue Mist Beard Tongue
Salvia sylvestris cv. ‘Blue Hill’	Blue Hill Sage
Salvia Raspberry Delight	Raspberry Delight Bush Sage
Salvia nemorosa ‘Lyrical Rose’	Lyrical Rose Sage

The best performers in this garden for drought tolerance have been Silver Horehound, Red Yucca, Platinum® Sage and Colorado Desert Bluestar. The grasses listed as Korean Feather Reed Grass have needed some supplemental water through 2011 and 2012. As a shrub Cheyenne Mock Orange is not only hardy but has wonderful blossoms in spring. However, it did suffer without supplemental watering in this garden during 2012. There are two of these shrubs and one is in partial sun and the other in full-sun. Both did suffer from drought

stress late in summer. The Buckwheat species, as in all the other gardens did extremely well in the drought along with a low ground cover shrub Panchito Manzanita. The Orange Carpet® Hummingbird Trumpet groundcover suffered through the drought. It produced substantially less flowers. The Alpine Willowherb also did not flower as well along with Little Trudy® Catnip. In 2014 during the November cold snap several plants suffered during the following spring and summer. Alpine Willowherb, Orange Carpet®

Hummingbird Trumpet, Avalanche White Sun Daisy and some of the Platinum® Sage all had severe dieback or did not generate new growth in spring. During the wet spring and early summer of 2015, the Cheyenne® Mock Orange and Silver Horehound have had severe dieback. However, the Turkish Veronica has expanded. Oregano was placed in the garden in 2012 and is seeding itself to help fill in areas. During 2015, some of the oregano and winecup needed to be thinned. The leadwort, one of the plants not labeled Plant Select is seeding itself in other areas of the garden as are the Sunset® Hyssop and Silver Horehound.

In 2017, all the plants thrived due to good moisture from the previous season. The Willowherb and Avalanche White Sun Daisy have not overwintered. The Colorado Desert Bluestar and Penstemon Blue Mist, Red Yucca have seeded throughout the garden. All the Salvia species have endured the extreme drought. There are no new additional plants added in 2018.

High and Dry Demonstration Gardens in Washington County

The High and Dry Demonstration Garden at Washington County was planted in response to the continuing drought in Northeast Colorado. The garden was initiated by the previous Extension Horticulturist, Joanne Jones. Rita Campbell, a Colorado Master Gardener and Joanne Jones planted this demonstration garden. These are plants which are both xeric and native. This garden explores the possibility of becoming established and surviving with only natural rainfall. The results from this garden will serve as an ongoing study about which plant species thrive on little, or no supplemental water.

The initial preparation of the garden was to measure a 400 square foot area and design the layout. Other than some grass cuttings for mulching around the roots, there were no other amendments added to the soil. The garden soil is a sandy loam. This garden is on a slight slope at the curve of the walking path around the fairgrounds.

Prior to planting of the High and Dry Garden, the plants were housed in a greenhouse. The plants were planted Saturday, June 10th, 2006 and watered well the same day. After this initial watering, there was no rainfall. Approximately three weeks after their planting they were given some supplemental water. The soil was not amended with any organic matter to help with water retention and no mulch was initially provided around the root zone. The plants were attempting to adapt to their new environment.

Most of the plants were not responding well to the drought even as xeric plants. It appeared that we

would have only had a third of the plants we started with. Jian-Kang Zhu from the University of Arizona states in his research of drought tolerance in plants that xerophytes have a thicker cuticle layer in the epidermis as a coping mechanism for drought. He adds that the water status of a plant is a function of water uptake by roots and loss via stomata and cuticle. No matter how well plants manage to absorb and conserve water, prolonged drought will damage cells sooner or later. Water deficit leads to the accumulation of toxic oxygen free radicals in plant cells. The toxic radicals have to be removed, for survival and continued growth. Stress proteins are made by metabolites such as trehalose, mannitol, praline, or glycine betaine.

However, Wraith, Baker and Blake in their research from Montana State University studied the varying ability of water uptake after drought in barley genotypes. The periods of water deficit in this study were 10 to 14 days, less than our period of drought in this demonstration garden. When the barley was watered at the soil surface it took the roots two to three days to resume water uptake. And after subsequent rewetting periods, the roots resumed a quicker period of water uptake. To solve the lack of moisture at the soil surface level, grass cuttings were acquired and used as mulch for the plants. Some plants are significantly damaged by the lack of supplemental water. With the current amount of snow during this winter season, this will help both insulate and provide needed moisture for these xeric and native plants.

Without the second supplement and other subsequent supplements, very little seems as though it would have

remained in the High and Dry garden, only demonstrating that because of a severe drought their root systems were not able to maintain the proteins to uptake water.

Among the hardiest of plants were buffalo grass, blue grama, western and Utah serviceberry, slender wheatgrass, aspen fleabane, James' buckwheat, sulphur-flower buckwheat, Rocky Mountain Fescue and Iris species.

The various species of penstemon which did the best were Firecracker, Rydberg's and Bluemist. The other species had varying degrees of success. Those penstemon are listed in order as best survival to least from Grand Mesa penstemon, littleflower, sidebells's, whipple's and upright blue beardtongue as the worst.

The complete list of plants chosen in this High and Dry Garden are listed as follows:

Indian ricegrass *Achnatherum/Oryzopsis hymenoides*

Netleaf Horsemint *Agastache urticifolia*

Nodding Onion *Allium cernuum*

Western Serviceberry *Amelanchier alnifolia*

Utah Serviceberry *Amelanchier utabensis*

Big Bluestem *Andropogon gerardii*

Small-leaf pussytoes *Antennaria parvifolia*

Golden columbine *Aquilegia chrysantha*

Fringed Sage *Artemisia frigida*

Blue Grama *Bouteloua gracilis*

Buffalograss *Buchloe dactyloides*

Bluejoint reedgrass *Calamagrostis Canadensis*

Bluebell bellflower *Campanula rotundifolia*

Curl-leaf Mountain Mahogany *Cercocarpus ledifolius*

Tufted Hairgrass *Deschampsia caespitosa*

Slender Wheatgrass *Elymus trachycaulus*

Aspen Fleabane *Erigeron speciosus*

James' Buckwheat *Erigeron jamesii*

Sulphur-flower Buckwheat *Erigeron umbellatum*

Rocky Mountain Fescue *Festuca saximontana*

Woodland Strawberry *Fragaria vesca*

Common Gaillardia *Gaillardia aristata*

Sticky purple Geranium *Geranium viscosissimum*

Scarlet Gilia *Ipomopsis aggregate*

Fivepetal Cliffbush *Jamesia Americana*

Dotted Blazing Star *Liatris punctata*

Oregon-grape *Mabonia repens*

Colorado Four O'clock *Mirabilis multiflora*

Prairie Jewel® Penstemon *Penstemon grandiflorus*

Firecracker Penstemon *Penstemon eatonii*

Grand Mesa Penstemon *Penstemon mensarum*

Pineneedle Beardtongue *Penstemon pinifolius*

Littleflower Penstemon *Penstemon procerus*

Rydberg's Penstemon *Penstemon rydbergii*

Sidebells's Penstemon *Penstemon secundiflorus*

Upright Blue Penstemon *Penstemon virgatus*

Whipple's Penstemon *Penstemon whippleanus*

Shrubby Cinquefoil *Potentilla floribunda*

Squaw apple *Peraphyllum ramosissimum*

Pawnee Buttes® Sand Cherry *Prunus besseyi*

Golden Currant *Ribes aureum*

Wax Currant *Ribes cereum*

Western Coneflower *Rudbeckia occidentalis*

Little Bluestem *Andropogon scoparium*

Canada Goldenrod *Solidago Canadensis*

Scarlet Globemallow *Sphaeralcea coccinea*

Swamp Verbena *Verbena hastate*

Vegetable Varieties Recommended for the Plains

Varieties which are bolded have produced well no matter what the season's extremes.

Tomato -	Better Boy, Early Girl , Tomato Primo Red
Tomato – Heirlooms -	Cherokee Purple, Mortgage Lifter, Giant Beefsteak , Brandywine
Swiss chard -	Bright Lights , Fordhook Giant, Magenta Sunset, Neon
Squash winter -	Spaghetti, Acorn -Honey Bear, Sugar Hubbard , Red Kuri,
.....	Butternut Hunter, Royal Ace PM
Squash – Heirloom -	Waltham Butternut
Squash summer -	Black Beauty, Emerald Delight, Delta, Patty Pan
Spinach -	Malabar- a vining spinach , New Zealand, Hellcat
Radish -	Easter Egg
Potato -	Yukon Gold
Pepper – Hot -	Anaheim, Big Chile, Jalapeno
Pepper – Sweet -	Red Bell, Green Bell, Mini Red Bell
Peas -	SugarSnap
Lettuce- Leaf -	Baby Star, New Red Fire, Merlot, Cimmaron ,
Lettuce- Small Heads -	Little Gem, Devil's Tongue –loose head/red leaves
Lettuce- Romaine -	Defender
Kohlrabi -	Express Forcer Hybrid
Onions -	Yellow –Walla Walla Sweet and white variety – Snow White
Garlic -	Chesnok Red
Eggplant -	White-Casper; Black-Big Dragon, Black King, Black Beauty
Cucumber -	Burpless Varieties, General Lee, Armenian
Corn – Sweet -	Yellow Corn-Golden Bantam, Honey & Cream
Carrots -	Danvers Half Long
Cabbage -	Chinese Varieties
Broccoli -	Pacman
Brussel Sprouts -	Jade Cross
Beets-.....	Kestrel, Detroit Dark Red, Bulls Blood, Chioggia
Beans- Pole – Heirloom –	Kentucky Blue , Bush variety - Best producer is Provider

Earth-Kind® Roses Demonstration Garden

By Linda Langelo, Horticulture Agent

Texas AgriLife Extension Service designates select rose cultivars as Earth-Kind® Roses through the Earth-Kind® Landscape Program. Any rose cultivar that gains this designated title has been through eight years of research and field trial data. A seven-member team of doctorate individuals including horticulturists, plant

pathologists, soil scientist and an entomologist select the roses. No pesticides, chemical fertilizer or organic materials are ever applied to the roses during the trial and research period of eight years. The idea is to have landscape roses which are low-maintenance, remain beautiful throughout the season and the homeowner

can be environmentally-responsible in caring for the landscape. This is similar to the idea of growing natives in your landscape. The idea being the reduction of the homeowners' input of resources. By making this one change, homeowners can conserve water, fertilizer and reduce their impact on the environment.

In Sedgwick County at the courthouse, we tested some of the Earth-Kind® Roses since 2013. We are testing four polyantha roses listed as follows:

- Cecile Brunner
- La Marne
- Marie Daly
- Sea Foam

The requirements for growing Earth-Kind Roses successfully are placing them in a full day of direct sun or at least eight hours. They must have good air movement around the leaves to prevent foliar diseases. Good drainage is also recommended. They do well in a variety of soil types including poorly aerated, highly alkaline clay soils. To help your roses in any soil type, add three inches of plant-derived compost. Watering from the soil level with drip irrigation keeps water off the leaves and conserves water by lessening the amount lost to evaporation. Also watering from the ground level keeps the leaves clean of "salty" water and here in Sedgwick County we add salt to improve the water quality, but we would add to burning the foliage of the roses if overhead watering were done. Lastly, mulching roses is also recommended which keeps the weeds down, conserves more water, can add nitrogen as it breaks down and mitigates the drastic temperature fluctuations in the soil. Mulch acts as an insulator like a blanket on the soil. Mulch should only be placed around the roses at a depth of 3- inches. Placing the mulch too deep can become a barrier to needed oxygen in the soil.

The Earth-Kind Rose bed which we have at the southwest side of the building follows most of the recommended requirements for their success. They get plenty of air movement, but they do get only about 6 hours of direct sun and about an hour of indirect sun. They also received plenty of compost before planting. There were signs of thrips after they were initially planted. We suspect thrips came in on these plants. Other than the initial insect problem there was some dieback after the first winter. We did purchase roses from what we

thought was a reputable grower. Be sure to purchase healthy roses. We ordered on-line, so we had to totally rely on the grower to pick healthy product. We pruned out the dead stems and they bloomed well through the first season. They have received regular watering from the ground level.

In the second growing season, we went into the winter after a brutal cold snap in November 2014. The day-time temperature started at 75 degrees and ended up at minus 7 in a matter of a few hours. This kind of a drop is too sudden for plants to acclimate to the change. The roses looked like they were frozen in place. We had a significant amount of dieback going into the spring and the new growth was slow to appear. Of the Earth-Kind Roses that we did tested, Cecil Brunner and La Marne were the hardest hit with significant dieback. It mid to late June before new growth appeared. This was partly due to a wet and cold spring which continued into late May. Overall, other than the initial thrips, these roses have had no other disease or pest issues.

In both 2015 and 2016, the roses were slow to start growing due to the colder springs. They ended in the fall blooming until a hard frost and had no disease or insect issues.

In 2017, the roses came out all well except Cecile Brunner. Cecile Brunner was slow to start. Eventually, all were very prolific during this season. There were no disease or insect issues this year. In 2018 we had the same results overall. In 2019, we are looking to replace Cecile Brunner and try another Earth Kind Rose.

Roses are a high maintenance plant. They need to be deadheaded. Their blossoms need to be cleaned out of the bed every day to prevent fungal diseases such as black spot. They are heavy feeders. They prefer ground level irrigation. To have a rose type that can do well with less input, helps to conserve water and reduce pesticides in our soil.

I would recommend giving them a try. There are other types of roses other than polyantha shrubs which are dwarf and medium. There are small shrubs and climbers within the list of choices. Plenty of different types to add to your landscape.

Recommended Trees for the Golden Plains Area

This is a listing of some underused trees that would do well here based on trials in the Colorado State University Arboretum by Jim Klett Ph.D., CSU Ornamental Specialist, published in **Dependable Landscape Trees**. My tree suggestions are added to this list based on area wide county site visit observations.

Acer nigrum 'Greencolumn' Greencolumn Black Maple, Maple Family, Aceraceae

No pest or disease problems; good heat tolerance. 40 high x 35 wide

Amelanchier x grandiflora 'Autumn Brilliance' Autumn Brilliance Serviceberry, Rose Family, Rosaceae

Some tendency toward suckering, but overall outstanding specimens with a fall color mix of orange, red and purple, lasting two weeks. No disease and pest problems observed in the arboretum trees. 25 high x 30 wide

Catalpa speciosa Northern Catalpa, Bignoniaceae Family

Tolerates hot weather, drought tolerant and grows in a wide range of soils including alkaline. Early summer flowers, white with purple markings. Fast-growing tree which can attract powdery mildew, leaf spot and verticillium wilt. 40 to 60 high x 20 to 40 wide.

Gleditsia triacanthos inermis 'Shademaster' Shademaster Thornless Honeylocust

Minor insect problems; a 1979 specimen has stayed in good health in the CSU arboretum. 45 high x 40 wide, Pea Family, Fabaceae Family

Heptacodium miconioides Seven-son flower Plant Select Introduction

Can be a small shrub or tall tree to 25 feet. Fast-growing and very adaptable to many soils. Flowers are white with moderate to dry water requirements. Has exfoliating bark. Member of the Honeysuckle Family. 25 high x 15 wide. Caprioliaceae Family, Honeysuckle Family

Malus sargentii 'Select A' Firebird Flowering Crabapple (white flowering)

Highly resistant to mildew, apple scab, fireblight and cedar apple rust. 8 high x 7 wide, Rose Family,

Rosaceae

Malus 'Thunderbird' Thunderbird Flowering Crabapple (pink flowering)

Resistant to fireblight. No pest problems have been observed. 16 high x 10 wide, Rose Family, Rosaceae

Ostrya virginiana American Hophornbeam, Ironwood

Gray-brown bark attractive; some minor leaf spot in recent years.

40 high x 30 wide, Betulaceae Family, Birch Family

Phellodendron amurense Amur Corktree,

No disease or insect problems; no cultural problems such as chlorosis and dieback. 45 high x 45 wide, Cork Tree Family, Rutaceae

Prunus x 'Accolade' Accolade Flowering Cherry, Rose Family, Rosaceae

This tree is fruitless. When these trees suffer from stress they attract borers and gummosis. One out of three samples in the arboretum have suffered from stress. The others are in good health. 50 high x 25 wide

Quercus macrocarpa Bur Oak, Beech Family, Fagaceae

Adapts to different soil types, urban conditions and dry conditions. Difficult to transplant, but once established will be a long-lived, slow-growing tree with no pest or disease problems except slight injury from galls. 55 high x 45 wide.

Quercus muchlenbergii Chinkapin Oak, Yellow Chestnut Oak, Beech Family

Adaptable to alkaline soils, no chlorosis or dieback, no problems with pests or disease. Recently planted in **Plant Select®** mulit site trials throughout Colorado and has done well. 50 high x 60 wide

Syringa reticulata 'Summer Snow' Summer Snow Japanese Tree Lilac

No disease or insect problems. Yellow fall color. 18 high x 14 wide, Oleaceae, Olive Family

Syringa pekinensis 'Peking Tree Lilac'

Light creamy white flowers with a light fragrance appear in early summer. Winter hardy plants and have adapted well to alkaline soil. 25 high x 20 wide, Oleaceae, Olive Family

Tilia cordata 'June Bride' June Bride Littleleaf Linden

The best *Tilia* cultivar. Minor pest problems such as aphids and sooty mold. 30 high x 25 wide. Malvaceae Family

Tilia americana 'Redmond' Redmond American Linden

Overwintering feature of red buds and twigs; attracts aphids and sooty mold follows – inconsistent with each season. 50 high x 40 wide. Malvaceae Family

Tilia cordata 'Chancellor' Chancellor Littleleaf Linden

Pyramidal growth habit that is very attractive and uniform, no dieback or chlorosis and minor problems with leaf spot and aphids. Malvaceae Family

Ulmus parvifolia, Chinese or Lacebark Elm

Resistant to Dutch elm disease. This has been proven to be a pest-free tree. 40 high x 50 wide. It has exfoliating bark. Ulmaceae Family

Ulmus x 'Mortan Stalwart' Commendation Elm

A mix of many elm species; resistant to Dutch elm disease with some leaf minor and leaf tatter. 25 high x 25 wide. Ulmaceae Family

Ulmus x 'Frontier' Frontier Elm

Resistant to Dutch elm disease. Prefers moist, rich soils but adaptable to poor soils; full sun; very tolerant of urban conditions and drought tolerant. Fall color is red-purple-burgundy and summer leaves are glossy, dark green. 35 high x 25 wide. Ulmaceae Family

Ulmus x 'Triumph' Triumph™ Elm

Excellent disease and pest resistance to Dutch elm disease, Elm Yellows and Elm Leaf Beetle; arching branches with aggressive roots to be planted away from sidewalks; adapt easily to extremes in pH, moisture, wind and heat. 50 high x 40 wide – elliptical form. Ulmaceae Family

Xanthoceras sorbifolium Yellowhorn (white flowers with red & yellow centers)

This does have pea-sized edible seeds. Looks good all summer. No pest problems; likes colder climates. Soapberry Family, Sapindaceae Family

Plant select: Clear Creek® Golden Yellowhorn

Spring white flowers with yellow centers turning maroon and leathery seedpods through winter; can be small tree or large shrub to 22 feet; moderate to xeric water requirements.

Collaboration with NRCS in Kit Carson County and Extension Native Plant Garden within Community Garden in Burlington

The NRCS is committed to a three-year project which has started as of spring 2016. Their goal was to sample the new Flow-Hives from Australia. These hives are non-disruptive because you can see through them and know when the honey is going to be available. There is a spigot attached to the hives so that you can turn the Flow Key™ when the honey is ready. There is no lifting of the hive, no mess, no expensive honey extraction and no injury to the bees. To attract bees to the hives,

the NRCS designed and implemented a native plant garden. To do this properly, they needed to supplement a spring, summer and fall food supply to the bees. Something must always be in bloom. The list below is what was planted:

<u>Species</u>	<u>Scientific Name</u>	<u>Bloom Time</u>
Alfalfa.....	<u><i>Medicago sativa</i></u>	Early Mid Late
Small burnet.....	<u><i>Sanguisorba minor</i></u>	Early Mid
Western Yarrow	<u><i>Achillea lanulosa</i></u>	Early Mid
Maxmilian sunflower	<u><i>Helianthus maximiliani</i></u>	Late
Purple coneflower.....	<u><i>Echinacea angustifolia</i></u>	Mid Late
Blue Flax.....	<u><i>Linum lewisii</i></u>	Early Mid
Purple prairie clover	<u><i>Dalea purpurea purpurea</i></u>	Mid Late
Black-eyed Susan.....	<u><i>Rudbeckia hirta</i></u>	Mid Late
Yellow sweetclover.....	<u><i>Melilotus officinale</i></u>	Mid Late
Showy milkweed	<u><i>Asclepias speciosa</i></u>	Mid
Rocky Mountain Penstemon.....	<u><i>Penstemon strictus</i></u>	Early Mid
Plains coreopsis.....	<u><i>Coreopsis tinctoria</i></u>	Early Mid
Large Beardtongue.....	<u><i>Penstemon grandiflorus</i></u>	Mid

Hives and Pollinator Plots

By Linda Langelo, CSU Horticulture Agent

Are you looking for a way to increase your crop yield? Pollinators these days are in shorter supply. There is a decline of honey bees and other native pollinators. Natural Resources Conservation Service (NRCS) Dori Seamans, Program Support Specialist and a private beekeeper and Steve Benson, owner of Papi’s Honey, reached out to partner with Burlington Conservation District in Burlington, Colorado, Pheasants Forever and Colorado State University Extension- Golden Plains Area. This partnership helped provide funding for a three year project. The title of the project is “The Burlington Community Garden Pollinator Project.”

The vision for this project is to:

1. Educate families, youth and agricultural producers in Kit Carson County about the importance of pollination and the need to create pollinator habitats.
2. Engage youth outreach and education by including youth in planting pollinator demonstration plots to showcase plants that attract honeybees, butterflies, other native bees, and insects.

3. Demonstrate the Flow Hive next to a traditional hive to teach beekeeping principles and raise awareness about the decline of honey bees and other native pollinators.
4. Harvest honey using new techniques that reduce disruption and stress to the beehive.

Now in the second year, the demonstration pollinator plot is going strong. Pollinator plants include a diversity of blooming plants throughout the season. Yellow and white sweetclover, blue flax, alfalfa, penstemons and coneflower are among the plants used. Pollinator plants that are favored for their longevity were coreopsis, Coreopsis palmate, blanket flower, Gaillardia aristata, and western yarrow, Achillea millefolium lanulosa . There are 12 different species of pollinators attracted to the garden, including our Colorado Hairstreak butterfly, Fritillaries and bumblebees. Later in the season, Monarchs arrive in mid-September. Waiting for the Monarchs are three milkweeds: 1) Prairie Milkweed, Asclepias sullivantii, 2) Rose Milkweed, Asclepias incarnate, 3) Butterfly Milkweed, Asclepias tuberosa.

However, within the first year of the project, Seaman was able to connect with the Burlington FFA students who assisted by growing wildflower seed and the Bethune High School students transferred the wildflowers to larger pots before planting them out in the garden. The Burlington High School seventh graders with the NRCS staff planted shrubs while learning about soil health and conservation.

The new Flow Hive invented by Stuart and Cedar Anderson, from Australia, which was invented to stop bees from being crushed in the harvesting of honey. It proved to be more challenging for Seamans and Benson as beekeepers. The Flow Hive was designed to be able to see into the hive and instead of removing the honey comb frames when the honey is ready for harvesting, there is a trough at the bottom of the honey comb frames, and by simply inserting a honey tube and a Flow Key in the bottom turning 90 degrees downward, honey flows into your jar.

Seamans and Benson learned the following:

1. When it came time to remove the plugs and drain the honey at the bottom of each frame, there was a glitch. The Flow key needed to be turned slowly. Turning it too hard or too quickly caused the cappings to rupture and the honey to leak out the sides.

2. Any leaking honey went into the brood boxes and drove the bees out of the hive.
3. There was more propolis on the frames than expected. Bees use propolis to seal any unwanted open spaces in the hive. This is a mix of saliva and beeswax. In Australia, this does not happen to this extent because the bloom season is longer and they overwinter their hives differently. The Andersons stated that it is important to have convex wax cappings over the cured honey, meaning that the bees need to have each honeycomb cell filled completely to the top before they cap the cells.
4. The bees in the Flow Hive became overly defensive of the pollinator plot at season's end, so the hive was removed due to liability issues being a community garden.
5. The honey that was harvested had a wonderful taste.

The end result being that collecting honey is not the same in other regions in the world. However, one general rule prevails with attracting pollinators, a diversity of blooming plants throughout the season to help feed the pollinators. In turn, farmers increase their opportunity for increasing crop yields on crops that need pollinators.

Colorado State University Trial Plant Gardens

By Linda Langelo, CSU Horticulture Agent

There are several trials that take place each season at the Colorado State University Trial Garden located at 1401 Remington Street, Fort Collins, CO. Each season it is open to the public from May to October.

These trials are conducted to determine how well these various plants perform in our Rocky Mountain environmental conditions. They are evaluated on the following conditions: high altitude, intense solar radiation, drying winds, severe hailstorms, large fluctuations between day and night temperatures and a season-long need for irrigation.

Within the trial garden are three separate trial gardens: Annual, Perennial and Plant Select. The annual trial garden is planted each year trialing new annuals. The perennial trial garden is planted every third season. The trial lasts for two years to allow the plants to overwinter twice before new perennials are introduced.

Trial team participants are seed breeders and/or growers from around the United States, Holland, Netherlands and Israel. You can access any of these trial garden results at the following link: <http://www.flowertrials.colostate.edu>.

Perennial Trial Selections

By Dr. Jim Klett

According to Dr. Klett: “The following seven perennials were recently selected by the Perennial Trial Garden Sub-committee as being superior after 3 years of growth and two winters. Plans are to utilize these in your designs and home gardens in 2019 and I think you will be happy with the results.” The two-year Perennial Trial program at Colorado State University is designed to test newer perennial cultivars that have been introduced in the past three years or less. Entries in this trial are allowed to overwinter twice before they are switched out for new entries. **Look for a new listings in 2020.**

Geum ‘Rustico™ Orange’ from Terra Nova® Nurseries (Geum x ‘TNGEURO’ PP28238)

A plant with a uniform appearance. The orange flowers were very prolific and foliage stayed dark green and very fresh looking throughout the season.

Flame® New Improved Purple from Dummen Orange® (Phlox paniculata Flame® New Improved Purple)

A very attractive and prolific flowering with a long bloom period. The plants had a very uniform growth habit with dark green foliage. A small splash of white at the base of each petal added a bit of “sparkle” to each flower as it matured. Plants had superior resistance to powdery mildew.

Kismet™ Raspberry Coneflower from Terra Nova® Nurseries (Echinacea ‘TNECHKR’ PP28768)

Prolific flowers formed a solid canopy of blooms over the plants. The plants had an attractive rustic look as

the peak bloom faded. The dark green foliage kept the plant attractive even at times when the flowers were not present. Plants had a very uniform growth habit and good branching. The KISMET™ series also features colors of orange, red and yellow.

Gaillardia ‘SpinTop Yellow Touch’ from Dummen Orange® (Gaillardia aristata ‘SpinTop Yellow Touch)

The plants have a small, compact growth habit. Flowers are very showy and predominately red, but had an edge of yellow around the tip of each blossom. The attractive green foliage complemented the bloom color. Cold hardiness was also very impressive as the survival rate was very good for a Gaillardia. Additional entries in the ‘SpinTop’ series seemed to have a superior cold hardiness as well.

Delasperma ‘Alan’s Apricot’ from Plant Select (Delosperma ‘Alan’s Apricot’ PPAF)

Flowers made this a standout for both unique color and continual bloom through the season. At peak bloom plants were just a carpet of Apricot colored flowers. The plants are uniform with great vigor and better cold hardiness than most Delasperma. These plants require low water and also tolerate some extra water in areas that normally kill other Delosperma. A great low maintenance plant.

Pepper Trial 2018

By Linda Langelo, CSU Horticulture Agent

This is a replicated pepper trial based on the work of Dr. Michael Bartolo. Dr. Michael Bartolo, CSU-Ag Experiment Station, Rocky Ford, CO states “that growing sweet peppers can be an enormous challenge in Colorado” in his research report titled, Shading Improves Colored Pepper Yield and Quality. Over the past five years, varieties of sweet peppers and colored bell peppers were grown under two different shade cloth values and the control was grown without shade cloth as part of a study to see how they each performed.

In Sedgwick County in our community garden we repeated part of the study by using a sweet pepper, Canario and a hot pepper, Anaheim as our varieties. We used a black shade cloth of 30 percent. Dr. Bartolo used 20 and 30 percent shade cloth, both black

and white.

Our results on both varieties of peppers showed no sign of sunscald and/or any other diseases. The size of the Anaheims and Canario grown under shade-cloth were twice that of those exposed to full sunlight. The Canarios were somewhat rounder. An Anaheim under the 30% shade cloth measured 10 and 11 inches long. Those not under the black shade cloth were about 7 inches. The colors were richer on both varieties under the black shade cloth over those exposed to the sunlight.

We plan on continuing the pepper trial through 2020. We may add more varieties as we continue.

Colorado Welcome Center Pollinator Garden Plant List

By Linda Langelo, CSU Horticulture Agent

Native Plants

Coneflower *Echinacea purpurea*

Non-Native– Cultivated Varieties

Western Spiderwort *Tradescantia* ‘Concord Grape’
Penstemon Blue Buckle *Penstemon virgatus* cv. ‘Blue Buckle’
Perennial Sunflower *Helianthus* ‘Lemon Queen’
Goldenrod *Solidago* R. ‘Fireworks’
New England Aster *Symphytotrichum novae-angliae* ‘Andenken an Alma Pötschke’

Pollinators are responsible for pollinating 30 percent of agriculture crops. The process of pollination is transferring pollen and seeds from one flower to another, fertilizing the plant so it can grow and produce food. Insect pollinators include bees, (honey bees, solitary species, bumblebees); pollen wasps (Masarinae); ants; flies including bee flies, hoverflies and mosquitoes; lepidopterans, both butterflies and moths; and flower beetles. Since bees are particularly difficult to identify, our Citizen Scientist Project will focus on common butterflies and moths that visit Colorado.

Other animals act as pollinators in the world. Birds and bats are among a 1,000 vertebrates out of 200,000 species of animals of which the rest are invertebrates.

In a May 13, 2018 article by the Genetic Literacy Project, the Environmental Protection Agency’s top pesticide regulator, Jim Jones said, “As you well know, pollinators are responsible for nearly one in every three bites of food you eat. In addition, they contribute nearly \$15 billion to the nation’s economy.”

Julesburg Library Pollinator Garden

By Linda Langelo, CSU Horticulture Agent

The reasoning behind creating a second pollinator garden is to decrease the distance between interrupted spaces for pollinators to travel for nectar and shelter. Both urban and rural development disrupts habitat for pollinators. This is called interrupted space.

The second reason for creating a pollinator garden in the town of Julesburg is to drive traffic into town. Tourists interested in seeing other types of pollinator gardens and seeing the town.

There is a Citizen Scientist Project that is connected with both the Julesburg Library and Welcome Center pollinator gardens. Students and local residents are going to observe through the season what pollinators visit the garden and on what plants. We hope to conduct this project over at least three seasons. Tourists will also be able to participate by filling out either a paper or on-line survey.

Plant List of Julesburg Library Pollinator Garden:

Native Plants

- Wine Cups*Callirhoe involucrate*
- Mexican Hat*Ratibida columnifera*
- Rocky Mountain Penstemon*Penstemon strictus*
- Lemon Beebalm.....*Mondarda citriodora*
- Shrubby Cinquefoil*Potentilla fruitcosa*

Non-natives

- Big Betony Superba*Stachys macrantha* cv. 'Superba'

Research Summary: Screening pre-emergence herbicides for control of glyphosate-resistant kochia in chemical fallow.

John Spring, Area Extension Agent, Julesburg CO

Overview:

Field trials were conducted to screen 13 different pre-emergent herbicides from 6 separate modes-of-action for potential use to improve control of glyphosate-resistant kochia in chemical fallow in eastern Colorado. Of the herbicides tested, the PSII inhibitors metribuzin and atrazine (Group 5), the PPO inhibitors sulfentrazone and flumioxazin (Group 14), and the HPPD inhibitor isoxaflutole (Group 27) all controlled kochia and Russian-thistle for at least 12 weeks after application (from early March to early June). To prevent selection of kochia populations resistant to these currently effective herbicides, they should be used in multiple-mode-of-action tank mixes in production fields. (Group 14 or 27 + Group 5 mixes highly recommended). Trials have been established to further test these herbicides under a range of realistic use patterns in the 2019 growing season. Financial support for the project from the Colorado Wheat Research Foundation is gratefully acknowledged.

Methods:

Field trials were established in early March, 2018 at two

sites: on the USDA-ARS Central Great Plains Research Station near Akron, CO, and the UNL High Plains Ag Lab near Sidney, NE. Trials were established in a randomized complete block design with 5 replications and individual plot size of 10x20 ft. Herbicide treatments (Table 1) were applied with a CO₂ powered hand sprayer on March 8 (Akron) and March 12 (Sidney). Both sites had naturally occurring populations of glyphosate-resistant kochia, and the Sidney site also had heavy Russian-thistle pressure. Weed emergence began much later than anticipated, with no substantial emergence of kochia or Russian-thistle noted until late April (kochia emergence begins by mid to late March in most years). Counts of emerged weeds were taken on a whole-plot basis at 12 weeks after application. The data was then analyzed for treatment differences using generalized linear mixed models with a negative binomial distribution and log link function in the *lme4* package in R. Overall model significance was confirmed with Wald chi-square tests in the R package *car*, and multiple comparisons conducted with Tukey's procedure with the package *lsmeans*.

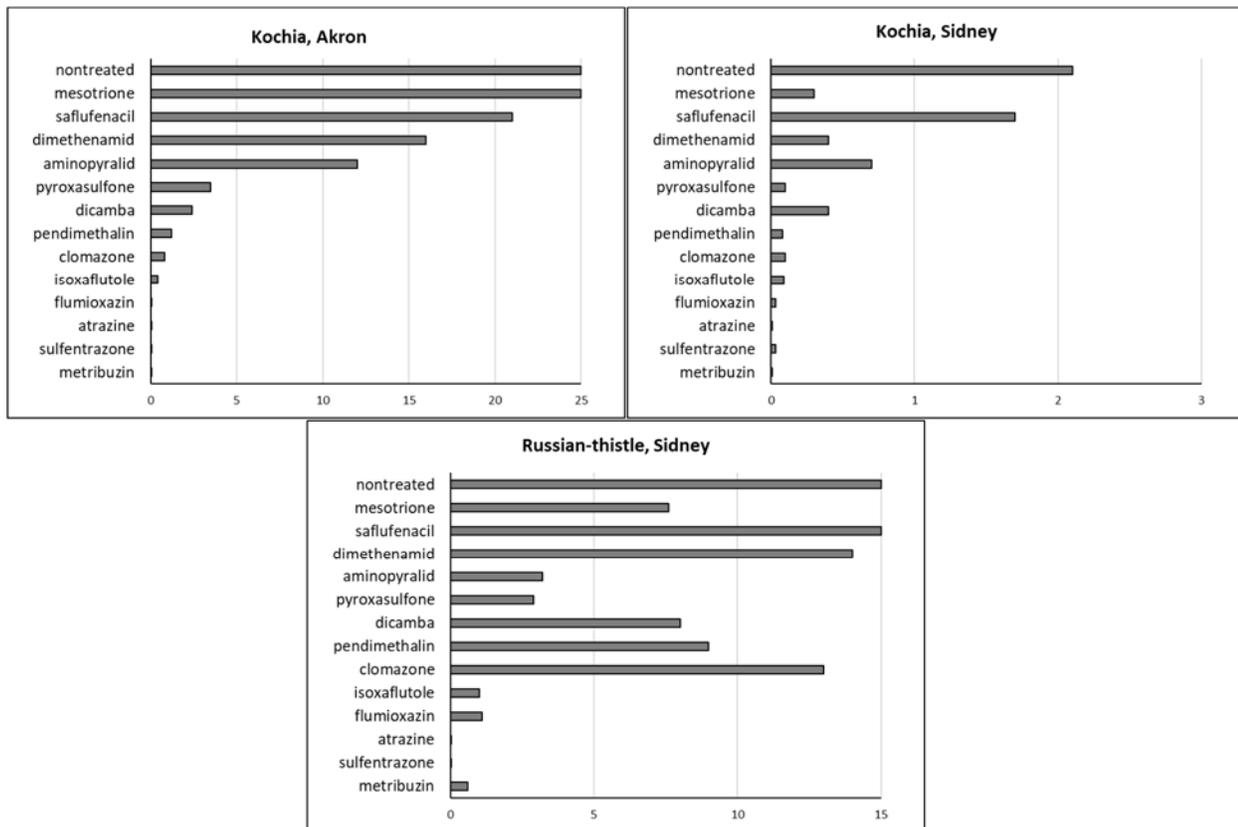
Table 1. Herbicide treatments and mean density of emerged kochia and Russian-thistle plants in early June 2018, 12 weeks after application. Numbers shown are plants per square meter.

Product	Active Ingredient	lb/ac	Rate (oz/ac)	MOA	Kochia (plants/m ²)			Russian-thistle		
					Akron	Sidney		Sidney (plants/m ²)		
Glory	<i>metribuzin</i>	0.5	11	5	0.01	a ‡	0.01	a	0.6	b
Spartan Charge	<i>sulfentrazone</i>	0.16	6.5	14	0.02	a	0.03	a	0.01	a
Atrazine 4L	<i>atrazine</i>	1	32	5	0.03	a	0.01	a	0.02	a
Valor SX	<i>flumioxazin</i>	0.06	2	14	0.06	ab	0.03	a	1.1	bc
Scoparia	<i>isoxaflutole</i>	0.08	5	27	0.4	abc	0.09	ab	1.0	bc
Command	<i>clomazone</i>	0.5	21	13	0.8	abcd	0.1	abc	13	de
Prowl H ₂ O	<i>pendimethalin</i>	1.9	64	3	1.2	bcde	0.08	ab	9	de
Clarity	<i>dicamba</i>	0.5	16	4	2.4	cdef	0.4	bcd	8	de
Zidua	<i>pyroxasulfone</i>	0.21	4	15	3.5	cdef	0.1	abc	2.9	bcd
Milestone	<i>aminopyralid</i>	0.02	1	4	12	def	0.7	cd	3.2	cde
Outlook	<i>dimethenamid</i>	0.85	18	15	16	ef	0.4	bcd	14	de
Sharpen	<i>salfufenacil</i>	0.09	4	14	21	f	1.7	d	15	de
Callisto	<i>mesotrione</i>	0.09	3	27	25	f	0.3	abc	7.6	de
nontreated	<i>na</i>	na	na	na	25	f	2.1	d	15	e

‡ Within the same column, means followed by the same letter are not significantly different.

Results and Discussion:

Figure 1. Mean density of emerged kochia and Russian-thistle plants in early June 2018, 12 weeks after application. Numbers shown are plants per square meter.



Several herbicides provided good control of kochia for at least 12 weeks after application at both sites (Table 1, Figure 1). The Group 5 herbicides atrazine and metribuzin, the Group 14 herbicides sulfentrazone and flumioxazin, and the Group 27 herbicide isoxaflutole provided the best control, and will be tested further. Other herbicides generally reduced emergence relative to the non-treated control, but not enough to be viable options for use in chemical fallow. In contrast to the poor performance of dicamba observed in these trials, previous research and grower experience in western Kansas has generally reported good pre-emergent control of kochia with dicamba at the rate tested. The length of residual activity of dicamba is relatively short (typically 4-8 weeks), and it is assumed that the later-than-expected kochia emergence in 2018 began after dicamba activity had started to dissipate in these trials, resulting in poor control. While this pattern would be

unlikely to present problems in every year, it suggests limitations to pre-emergence use of dicamba in eastern Colorado chemical fallow. If dicamba is used, it should be tank-mixed with longer-lasting products. Similarly, saflufenacil shows good activity on emerged kochia, but has a very short period of residual activity and is not a good fit for pre-emergence use in fallow.

Kochia is well known for its ability to develop herbicide resistance. While resistance to Group 14 (e.g. sulfentrazone, flumioxazin) and 27 herbicides (e.g. isoxaflutole) is not currently known in kochia, it has been found in other weed species, and is a relatively high risk in kochia as well. Group 5 (e.g. atrazine, metribuzin) resistance has been found in kochia in Colorado, but is not currently wide-spread. In both cases, continued efficacy of these products for kochia control depends on good stewardship practices. Tank-mixing multiple

modes-of-action is the best herbicide use strategy for preventing resistance, and is essential for responsible use of these products. In chemical-fallow, tank-mixes of a Group 14 herbicide (sulfentrazone or flumioxazin) plus a Group 5 herbicide (atrazine or metribuzin) or a Group 27 herbicide (isoxaflutole) plus a Group 5 are synergistic, and highly recommended. Which particular herbicides are best will depend on rotation plans and other factors. Recent market availability of generic versions of both sulfentrazone and flumioxazin has substantially reduced the cost of these active ingredients over the last 2 years.

Trials have been established to compare various tank-mix combinations and both fall and spring application

timings in the 2019 growing season. For questions regarding either of these trials, please contact John Spring, (970)474-3479, or john.spring@colostate.edu.

Acknowledgments:

The Colorado Wheat Research Foundation provided grant funding to support this project, which is gratefully acknowledged. Dr. Merle Vigil (ARS Akron), and Dr. Cody Creech (UNL Sidney) are acknowledged for providing trial space and supporting the project.

Colorado State University



CSU Crops Testing is an Extension program within the Department of Soil and Crop Sciences. The Crops Testing group is housed in the Plant Sciences Building on the CSU Main campus in Fort Collins, CO. Our principal field location is at the USDA/ARS Central Great Plains Research Center at Akron, CO.

Crop Variety Performance Trials are conducted by Colorado State University's Crops Testing to provide unbiased and reliable information to Colorado crop producers to help them make better variety decisions.

Each crop in our program has a report generated and is posted to our web site. That web address is www.csucrops.agsci.colostate.edu. Technical reports are also available for each crop.

The following tables include crop testing data and results for crops of interest in the Golden Plains Area.

Table 1. 2018 Irrigated Winter Wheat Variety Performance Trial at Haxtun*by Jerry Johnson, Scott Haley, Sally Jones-Diamond, and Ed Asfeld*

Variety	Brand/Source	Market Class	Yield	Test Weight	Plant Height
			bu/ac	lb/bu	in
WB4303	WestBred Monsanto	HRW	90.9	57.7	31
WB4418	WestBred Monsanto	HRW	87.0	60.2	30
WB-Grainfield	WestBred Monsanto	HRW	86.4	60.3	33
Breck	PlainsGold	HWW	83.4	60.9	33
SY Wolf	AgriPro Syngenta	HRW	82.7	58.4	33
LCS Chrome	Limagrain Cereal Seeds	HRW	82.3	60.9	34
SY Sunrise	AgriPro Syngenta	HRW	82.2	60.2	29
Denali	PlainsGold	HRW	81.6	58.3	34
Brawl CL Plus	PlainsGold	HRW	81.0	61.4	32
Sunshine	PlainsGold	HWW	80.6	57.9	33
WB4458	WestBred Monsanto	HRW	77.9	60.8	34
Long Branch	Dyna-Gro Seed	HRW	76.9	58.1	33
Thunder CL	PlainsGold	HWW	73.9	58.6	33
AM Eastwood	AgriMaxx Wheat	HRW	72.1	59.1	29
Underwood	Dyna-Gro Seed	HRW	71.3	59.7	31

Table 1 continues....

Table 1 continued

Variety	Brand/Source	Market Class	Yield bu/ac	Test Weight lb/bu	Plant Height in
Experimentals					
CO15D129R	Colorado State University exp.	HRW	91.3	62.4	31
CO13D1486	Colorado State University exp.	HWW	85.1	58.9	30
CO15D027RC	Colorado State University exp.	HRW	83.4	59.9	35
CO13D1714	Colorado State University exp.	HWW	83.2	59.7	33
CO13D1638	Colorado State University exp.	HWW	82.3	58.4	35
CO12D296	Colorado State University exp.	HRW	81.7	60.0	32
CO15D098R	Colorado State University exp.	HRW	81.1	60.4	35
CO13007	Colorado State University exp.	HRW	80.4	60.0	35
CO13D1164	Colorado State University exp.	HWW	80.1	60.1	33
CO13D0787	Colorado State University exp.	HRW	78.9	61.1	33
CO15D063RC	Colorado State University exp.	HRW	78.8	61.2	31
CO12D1770	Colorado State University exp.	HRW	78.5	58.9	30
CO12D597	Colorado State University exp.	HRW	78.1	58.5	33
CO15D127R	Colorado State University exp.	HRW	78.1	59.2	31
CO15D130W	Colorado State University exp.	HWW	77.3	58.4	31
CO15D094R	Colorado State University exp.	HRW	76.4	61.3	33
CO13D1383	Colorado State University exp.	HWW	76.3	58.2	31
CO15A018	Colorado State University exp.	HRW	75.6	57.2	32
CO13D1299	Colorado State University exp.	HWW	74.8	58.0	34
CO14A070	Colorado State University exp.	HRW	74.5	59.9	33
CO14A136	Colorado State University exp.	HRW	72.1	57.8	34
CO14A050	Colorado State University exp.	HRW	70.5	60.7	30
CO15SFD092	Colorado State University exp.	HRW	68.8	59.6	32
	Average		79.4	59.5	32
	*LSD (P<0.30)		2.9		

*If the difference between two variety yields equals or exceeds the LSD value, there is a 70% chance the difference is significant. Variety yields in bold are in the top LSD group.

Site Information

Cooperator: Boerner Farms
 Harvest date: July 14, 2018
 Planting date: October 23, 2017
 Trial Comments: Trial planted after corn silage harvest into moderate-heavy corn residue. Field was disced twice and then vertically tilled prior to planting. Good seed bed and trial irrigated immediately after planting. Plants emerged in mid-late November. In late March plants were very small but stands were acceptable. Some varieties were just heading in early June, no disease was noted at that time. Minor hail damage occurred in mid June. Fusarium head blight was found across trial in early July. No other diseases were noted.

Table 2. 2018 Dryland Winter Wheat Variety Performance Trial at Akron*by Jerry Johnson, Scott Haley, Sally Jones-Diamond, and Ed Asfeld*

Variety	Brand/Source	Market Class	Yield	Test Weight	Plant Height
			bu/ac	lb/bu	in
Langin	PlainsGold	HRW	100.4	61.1	37
Antero	PlainsGold	HWW	90.4	58.8	39
Avery	PlainsGold	HRW	88.4	60.2	39
Breck	PlainsGold	HWW	87.6	61.4	38
Denali	PlainsGold	HRW	86.5	61.0	38
Sunshine	PlainsGold	HWW	86.3	56.6	36
AM Eastwood	AgriMaxx Wheat	HRW	85.3	60.9	33
WB-Grainfield	WestBred Monsanto	HRW	85.2	58.6	37
Byrd	PlainsGold	HRW	85.1	60.9	38
WB4462	WestBred Monsanto	HRW	84.7	60.9	42
Long Branch	Dyna-Gro Seed	HRW	84.6	56.0	37
SY Monument	AgriPro Syngenta	HRW	84.1	59.1	37
WB4721	WestBred Monsanto	HRW	83.3	61.8	37
WB4418	WestBred Monsanto	HRW	83.2	60.1	34
LCS Mint	Limagrain Cereal Seeds	HRW	83.2	61.6	40
Brawl CL Plus	PlainsGold	HRW	82.6	61.4	37
Winterhawk	WestBred Monsanto	HRW	82.3	60.1	38
SY Wolf	AgriPro Syngenta	HRW	82.0	61.3	36
Oakley CL	Kansas Wheat Alliance	HRW	81.6	59.8	37
SY Legend CL2	AgriPro Syngenta	HRW	81.3	60.4	35
SY Rugged	AgriPro Syngenta	HRW	80.0	57.9	32
LCS Chrome	Limagrain Cereal Seeds	HRW	77.3	60.5	37
Hatcher	PlainsGold	HRW	76.7	59.1	37
Snowmass	PlainsGold	HWW	75.9	60.8	40
Incline AX	PlainsGold	HRW	75.4	58.5	37

Table 2 continues....

Table 2 continued

Variety	Brand/Source	Market Class	Yield bu/ac	Test Weight lb/bu	Plant Height in
Experimentals					
CO15D129R	Colorado State University exp.	HRW	96.2	63.0	36
CO13D1299	Colorado State University exp.	HWW	92.1	59.5	36
CO12D296	Colorado State University exp.	HRW	90.7	59.8	34
CO13007	Colorado State University exp.	HRW	89.8	60.3	39
CO13D1783	Colorado State University exp.	HRW	88.2	58.9	37
CO13D1638	Colorado State University exp.	HWW	88.1	60.1	37
CO15SFD061	Colorado State University exp.	HRW	88.0	58.6	40
CO15A018	Colorado State University exp.	HRW	87.8	58.9	35
CO12D1770	Colorado State University exp.	HRW	87.7	59.9	35
CO13D1479	Colorado State University exp.	HWW	87.7	61.3	38
CO15D092R	Colorado State University exp.	HRW	87.7	58.8	36
CO13003C	Colorado State University exp.	HRW	87.6	60.4	38
CO15D098R	Colorado State University exp.	HRW	86.9	61.5	39
CO15D130W	Colorado State University exp.	HWW	86.7	60.4	33
CO15D094R	Colorado State University exp.	HRW	85.8	61.3	38
CO15D127R	Colorado State University exp.	HRW	85.8	60.8	36
CO14A136	Colorado State University exp.	HRW	85.7	59.8	36
CO15D063RC	Colorado State University exp.	HRW	84.3	61.7	35
CO14A070	Colorado State University exp.	HRW	84.0	59.7	38
CO13D1383	Colorado State University exp.	HWW	83.5	60.1	35
CO13D0787	Colorado State University exp.	HRW	83.4	62.0	37
CO14A050	Colorado State University exp.	HRW	83.3	60.6	37
CO13D1486	Colorado State University exp.	HWW	83.2	59.3	36
CO12D597	Colorado State University exp.	HRW	82.8	59.9	39
CO15SFD092	Colorado State University exp.	HRW	80.0	60.2	34
CO15D027RC	Colorado State University exp.	HRW	80.0	61.4	40
CO13D1714	Colorado State University exp.	HWW	79.1	58.3	38
CO13D1164	Colorado State University exp.	HWW	78.8	59.5	40
NHH144913-3	University of Nebraska exp.	HRW	77.7	55.2	35
CO15SFD095	Colorado State University exp.	HRW	76.4	62.3	38
CO15SFD107	Colorado State University exp.	HRW	75.9	61.0	37
	Average		84.4	60.1	37
	^a LSD (P<0.30)		3.2		

^aIf the difference between two variety yields equals or exceeds the LSD value, there is a 70% chance the difference is significant. Variety yields in bold are in the top LSD group.

Site Information

Cooperator: Central Great Plains Research Station
 Harvest date: July 12, 2018
 Planting date: October 8, 2017
 Trial Comments: Very good soil moisture at planting. Snowed and rained day after planting. Very little plant growth in the fall. Trial received 0.72" of precipitation in January and another 0.5" in February. In April, stands were acceptable and soil moisture was average. Trial received precipitation in mid-April (over 2") and again in early May (1.8"). There was vigorous growth and excellent stands by early May with no disease noted. The trial had frequent rainfall throughout May and June, over 6.5" in May and another 2.7" in June. CSU Pathologist, Dr. Kirk Broders, identified Bacterial leaf streak in the trial in mid-June but at low levels.

Table 3. 2018 Dryland Winter Wheat Variety Performance Trial at Julesburg*by Jerry Johnson, Scott Haley, Sally Jones-Diamond, and Ed Asfeld*

Variety	Brand/Source	Market Class	Yield	Test Weight	Plant Height
			bu/ac	lb/bu	in
SY Monument	AgrPro Syngenta	HRW	72.5	61.0	32
WB4418	WestBred Monsanto	HRW	71.1	61.6	30
Antero	PlainsGold	HWW	69.7	62.0	32
Breck	PlainsGold	HWW	69.5	63.6	31
Denali	PlainsGold	HRW	68.7	61.9	37
WB4462	WestBred Monsanto	HRW	68.2	61.9	33
Winterhawk	WestBred Monsanto	HRW	68.2	62.5	35
Langin	PlainsGold	HRW	66.2	62.3	31
LCS Chrome	Limagrain Cereal Seeds	HRW	65.1	63.0	35
Hatcher	PlainsGold	HRW	65.1	62.7	31
Oakley CL	Kansas Wheat Alliance	HRW	64.8	62.0	31
WB-Grainfield	WestBred Monsanto	HRW	64.4	61.7	33
WB4721	WestBred Monsanto	HRW	64.4	64.0	32
Brawl CL Plus	PlainsGold	HRW	63.0	62.6	31
Sunshine	PlainsGold	HWW	62.9	58.9	31
Long Branch	Dyna-Gro Seed	HRW	62.6	59.9	30
SY Wolf	AgrPro Syngenta	HRW	62.4	61.6	31
LCS Mint	Limagrain Cereal Seeds	HRW	62.1	63.3	34
SY Rugged	AgrPro Syngenta	HRW	61.7	61.6	29
Snowmass	PlainsGold	HWW	61.2	63.2	34
Byrd	PlainsGold	HRW	61.1	61.8	30
SY Legend CL2	AgrPro Syngenta	HRW	60.9	61.5	31
Avery	PlainsGold	HRW	60.9	60.7	32
AM Eastwood	AgrMaxx Wheat	HRW	58.1	61.3	28
Incline AX	PlainsGold	HRW	57.8	59.7	31

Table 3 continues....

Table 3 continued

Variety	Brand/Source	Market Class	Yield bu/ac	Test Weight lb/bu	Plant Height in
Experimentals					
CO15D098R	Colorado State University exp.	HRW	75.6	63.2	35
CO12D296	Colorado State University exp.	HRW	74.8	62.7	31
CO15D129R	Colorado State University exp.	HRW	71.8	64.4	32
CO13007	Colorado State University exp.	HRW	71.6	62.5	34
CO15D094R	Colorado State University exp.	HRW	70.1	62.7	33
CO12D597	Colorado State University exp.	HRW	70.1	62.9	34
CO14A070	Colorado State University exp.	HRW	68.1	61.4	34
CO15A018	Colorado State University exp.	HRW	68.0	59.6	30
CO13D1164	Colorado State University exp.	HWW	67.0	62.5	33
CO13D1486	Colorado State University exp.	HWW	66.8	61.7	33
CO15SFD061	Colorado State University exp.	HRW	66.4	60.1	35
CO13D0787	Colorado State University exp.	HRW	66.3	63.8	35
CO15D130W	Colorado State University exp.	HWW	66.1	61.3	31
CO12D1770	Colorado State University exp.	HRW	66.0	61.2	31
CO13D1714	Colorado State University exp.	HWW	65.0	61.9	34
CO13D1783	Colorado State University exp.	HRW	64.7	59.3	34
CO13D1638	Colorado State University exp.	HWW	64.5	61.4	33
CO15D027RC	Colorado State University exp.	HRW	64.5	62.3	35
NHH144913-3	University of Nebraska exp.	HRW	63.3	59.1	32
CO14A050	Colorado State University exp.	HRW	63.2	63.0	32
CO15SFD092	Colorado State University exp.	HRW	62.5	61.4	32
CO13D1299	Colorado State University exp.	HWW	62.4	61.2	32
CO15D127R	Colorado State University exp.	HRW	62.2	61.4	31
CO15D092R	Colorado State University exp.	HRW	61.0	59.4	32
CO13003C	Colorado State University exp.	HRW	60.9	60.9	33
CO15SFD107	Colorado State University exp.	HRW	60.8	62.0	34
CO14A136	Colorado State University exp.	HRW	60.7	60.7	31
CO13D1479	Colorado State University exp.	HWW	59.7	61.0	35
CO15SFD095	Colorado State University exp.	HRW	58.0	64.5	32
CO13D1383	Colorado State University exp.	HWW	57.7	60.1	30
CO15D063RC	Colorado State University exp.	HRW	57.2	61.8	32
Average			64.8	61.8	32
*LSD (P<0.30)			2.7		

*If the difference between two variety yields equals or exceeds the LSD value, there is a 70% chance the difference is significant. Variety yields in bold are in the top LSD group.

Site Information

Cooperator: Carlson Farms
 Harvest date: July 10, 2018
 Planting date: October 8, 2017
 Trial Comments: Excellent soil moisture at planting. Very little plant growth in the fall due to late planting. Little moisture received over winter. By end of March plants had 3-4 leaves and emergence was satisfactory. Ground was hard and dry on top. Consistent rain events in April and May. Early June was hot and dry but more rains received in last half of June.

Table 4. 2018 Dryland Winter Wheat Variety Performance Trial at Yuma*by Jerry Johnson, Scott Haley, Sally Jones-Diamond, and Ed Asfeld*

Variety	Brand/Source	Market Class	Yield	Test Weight	Plant Height
			bu/ac	lb/bu	in
Sunshine	PlainsGold	HWW	74.7	59.9	35
Avery	PlainsGold	HRW	72.9	61.8	37
Long Branch	Dyna-Gro Seed	HRW	72.7	60.0	32
Denali	PlainsGold	HRW	71.3	62.5	36
Snowmass	PlainsGold	HWW	71.1	61.9	38
SY Wolf	AgriPro Syngenta	HRW	70.7	61.4	32
Incline AX	PlainsGold	HRW	70.6	61.4	34
Breck	PlainsGold	HWW	70.3	63.6	38
Langin	PlainsGold	HRW	69.6	61.2	33
SY Monument	AgriPro Syngenta	HRW	69.0	60.9	32
Antero	PlainsGold	HWW	68.7	60.5	36
WB4418	WestBred Monsanto	HRW	68.0	60.4	33
Byrd	PlainsGold	HRW	67.8	61.9	36
WB4462	WestBred Monsanto	HRW	65.3	60.5	37
Hatcher	PlainsGold	HRW	63.7	62.2	36
Winterhawk	WestBred Monsanto	HRW	62.9	61.0	37
WB-Grainfield	WestBred Monsanto	HRW	62.8	60.4	36
AM Eastwood	AgriMaxx Wheat	HRW	62.6	62.0	27
SY Legend CL2	AgriPro Syngenta	HRW	62.4	61.1	34
SY Rugged	AgriPro Syngenta	HRW	61.1	60.4	30
LCS Mint	Limagrain Cereal Seeds	HRW	60.2	61.3	37
Oakley CL	Kansas Wheat Alliance	HRW	59.8	60.5	33
Brawl CL Plus	PlainsGold	HRW	58.7	61.3	36
WB4721	WestBred Monsanto	HRW	52.8	61.5	32
LCS Chrome	Limagrain Cereal Seeds	HRW	48.7	61.1	35

Table 4 continues....

Table 4 continued

Variety	Brand/Source	Market Class	Yield bu/ac	Test Weight lb/bu	Plant Height in
Experimentals					
CO14A070	Colorado State University exp.	HRW	76.0	61.8	36
CO13D1638	Colorado State University exp.	HRW	75.8	62.6	36
CO12D296	Colorado State University exp.	HRW	74.8	62.6	34
CO12D597	Colorado State University exp.	HRW	74.7	63.4	36
CO13D1783	Colorado State University exp.	HRW	73.8	61.2	37
CO15D092R	Colorado State University exp.	HRW	72.9	60.6	34
CO15D129R	Colorado State University exp.	HRW	72.4	63.4	34
CO15D130W	Colorado State University exp.	HRW	72.0	61.4	32
CO13D1714	Colorado State University exp.	HRW	71.9	61.8	35
CO13D1383	Colorado State University exp.	HRW	71.2	62.6	33
CO13D1299	Colorado State University exp.	HRW	71.1	62.0	36
CO13D1479	Colorado State University exp.	HRW	71.0	61.8	35
CO15A018	Colorado State University exp.	HRW	70.6	60.4	33
CO13D1486	Colorado State University exp.	HRW	70.1	62.1	36
CO13D0787	Colorado State University exp.	HRW	66.8	62.5	34
CO14A050	Colorado State University exp.	HRW	66.7	62.1	36
CO15SFD061	Colorado State University exp.	HRW	66.4	61.2	35
CO15D063RC	Colorado State University exp.	HRW	66.3	63.4	37
CO15D127R	Colorado State University exp.	HRW	65.5	61.5	33
CO13D1164	Colorado State University exp.	HRW	64.9	61.3	37
CO14A136	Colorado State University exp.	HRW	64.8	62.6	34
CO13003C	Colorado State University exp.	HRW	64.3	61.6	35
CO15D027RC	Colorado State University exp.	HRW	63.9	60.3	37
CO15SFD107	Colorado State University exp.	HRW	63.8	62.0	38
CO15D098R	Colorado State University exp.	HRW	62.1	62.3	37
CO13007	Colorado State University exp.	HRW	61.6	61.5	38
CO12D1770	Colorado State University exp.	HRW	61.1	62.3	33
CO15D094R	Colorado State University exp.	HRW	60.6	62.9	40
CO15SFD095	Colorado State University exp.	HRW	57.7	62.7	36
NHH144913-3	University of Nebraska exp.	HRW	57.4	59.4	33
CO15SFD092	Colorado State University exp.	HRW	57.3	61.7	32
Average			66.6	61.6	35
*LSD (P<0.30)			4.4		

*If the difference between two variety yields equals or exceeds the LSD value, there is a 70% chance the difference is significant. Variety yields in bold are in the top LSD group.

Site Information

Cooperator: Andrews Brothers
 Harvest date: July 9, 2018
 Planting date: October 6, 2017
 Trial Comments: Planted relatively late, but into excellent soil moisture. Stands were uniform and a lot of growth in the fall. Trial received small amounts of moisture during the winter. Stands were still acceptable in early April but wheat was showing drought stress by then. Good rains in late-April and throughout May and June with over 3" received on June 6 and another 1.2" on June 24. Some hail damage noted at harvest.

Table 5. 2018 Dryland Winter Wheat Variety Performance Trial at Orchard*by Jerry Johnson, Scott Haley, Sally Jones-Diamond, and Ed Asfeld*

Variety	Brand/Source	Market Class	Yield	Test Weight	Plant Height	Wheat Stem Sawfly
			bu/ ac	lb/bu	in	score (1-9) ^a
Langin	PlainsGold	HRW	63.1	62.6	31	4
Byrd	PlainsGold	HRW	56.7	63.4	31	6
Antero	PlainsGold	HWW	54.5	62.9	29	5
Breck	PlainsGold	HWW	54.5	64.7	25	6
Incline AX	PlainsGold	HRW	53.1	61.2	30	5
Oakley CL	Kansas Wheat Alliance	HRW	52.4	62.7	32	6
Hatcher	PlainsGold	HRW	52.4	63.3	30	5
Denali	PlainsGold	HRW	52.2	63.9	29	4
WB-Grainfield	WestBred Monsanto	HRW	51.3	63.7	28	4
Brawl CL Plus	PlainsGold	HRW	51.1	62.9	31	5
SY Monument	AgruPro Syngenta	HRW	49.6	63.6	28	4
WB4462	WestBred Monsanto	HRW	49.5	63.9	29	3
Sunshine	PlainsGold	HWW	48.9	63.8	26	5
Long Branch	Dyna-Gro Seed	HRW	48.0	63.6	27	7
Avery	PlainsGold	HRW	47.9	63.6	30	5
SY Rugged	AgruPro Syngenta	HRW	47.9	62.3	25	8
WB4721	WestBred Monsanto	HRW	47.1	64.3	27	4
Winterhawk	WestBred Monsanto	HRW	46.9	63.6	28	4
LCS Mint	Limagrain Cereal Seeds	HRW	46.3	63.8	26	3
SY Legend CL2	AgruPro Syngenta	HRW	46.1	64.1	30	7
WB4418	WestBred Monsanto	HRW	45.8	63.1	25	1
AM Eastwood	AgruMaxx Wheat	HRW	45.3	63.8	25	3
Snowmass	PlainsGold	HWW	45.3	64.2	28	7
SY Wolf	AgruPro Syngenta	HRW	44.2	63.3	28	2
LCS Chrome	Limagrain Cereal Seeds	HRW	35.4	63.5	27	7

Table 5 continues....

Table 5 continued

Variety	Brand/Source	Market Class	Yield bu/ac	Test Weight lb/bu	Plant Height in	Wheat Stem Sawfly score (1-9) ^a
Experimentals						
CO15D092R	Colorado State University exp.	HRW	63.4	63.5	27	5
CO12D597	Colorado State University exp.	HRW	60.9	63.2	28	5
CO13D1783	Colorado State University exp.	HRW	59.4	63.1	28	5
CO12D296	Colorado State University exp.	HRW	58.5	64.4	31	5
CO14A136	Colorado State University exp.	HRW	57.5	63.4	32	5
CO15D098R	Colorado State University exp.	HRW	57.4	64.1	30	4
CO14A070	Colorado State University exp.	HRW	57.3	63.3	29	4
CO14A050	Colorado State University exp.	HRW	57.1	63.4	30	5
CO13D1299	Colorado State University exp.	HWW	56.8	63.4	25	5
CO15SFD061	Colorado State University exp.	HRW	56.7	61.9	30	4
CO15A018	Colorado State University exp.	HRW	56.2	62.8	25	6
CO13D0787	Colorado State University exp.	HRW	55.7	64.4	29	6
CO13D1383	Colorado State University exp.	HWW	55.2	63.7	28	3
CO15D129R	Colorado State University exp.	HRW	55.2	64.4	28	4
CO15D127R	Colorado State University exp.	HRW	54.3	63.2	28	5
CO13D1714	Colorado State University exp.	HWW	53.9	63.6	30	6
CO13003C	Colorado State University exp.	HRW	53.8	63.2	33	4
CO15SFD107	Colorado State University exp.	HRW	53.5	64.0	28	1
CO15SFD095	Colorado State University exp.	HRW	53.4	65.1	31	2
CO13D1638	Colorado State University exp.	HWW	53.1	63.1	29	6
CO13D1486	Colorado State University exp.	HWW	52.3	62.8	26	6
CO12D1770	Colorado State University exp.	HRW	52.0	63.7	30	5
CO13D1479	Colorado State University exp.	HWW	51.5	63.4	28	4
CO13007	Colorado State University exp.	HRW	48.8	63.1	31	6
CO15SFD092	Colorado State University exp.	HRW	48.6	63.6	24	2
CO13D1164	Colorado State University exp.	HWW	47.6	63.2	32	5
CO15D094R	Colorado State University exp.	HRW	47.5	64.9	25	5
CO15D130W	Colorado State University exp.	HWW	47.5	62.3	26	5
CO15D027RC	Colorado State University exp.	HRW	47.2	64.0	26	4
CO15D063RC	Colorado State University exp.	HRW	46.8	64.5	29	3
NHH144913-3	University of Nebraska exp.	HRW	42.5	61.3	31	3
Average			51.7	63.5	28	5
^b LSD (P<0.30)			3.1			

^aWheat stem sawfly score: 1 equals no damage/cutting and 9 equals severe cutting

^bIf the difference between two variety yields equals or exceeds the LSD value, there is a 70% chance the difference is significant. Variety yields in bold are in the top LSD group.

Site Information

Cooperator: Wickstrom Farms

Harvest date: July 2, 2018

Planting date: September 18, 2017

Trial Comments: Planted into excellent moisture and trial received rain in week following planting. Plant tillering was weak in the fall. Received moderate moisture in mid-January and February. More moisture received in mid-March. By end of March plant stands and growth were satisfactory with sufficient soil moisture. However, by the middle of April the trial was dry. Wheat stem sawfly damage was significant in June.

Table 6. 2018 Dryland Winter Wheat Variety Performance Trial at Burlington*by Jerry Johnson, Scott Haley, Sally Jones-Diamond, and Ed Asfeld*

Variety	Brand/Source	Market Class	Yield	Test Weight	Plant Height	Lodging
			bu/ac	lb/bu	in	score (1-9) ^a
Breck	PlainsGold	HWW	88.1	56.6	35	2
WB4418	WestBred Monsanto	HRW	86.4	54.9	35	1
WB4462	WestBred Monsanto	HRW	86.3	57.9	40	2
SY Monument	AgnPro Syngenta	HRW	85.7	56.0	37	1
Denali	PlainsGold	HRW	85.5	56.6	40	1
LCS Chrome	Limagrain Cereal Seeds	HRW	85.4	56.0	38	1
WB4721	WestBred Monsanto	HRW	84.6	56.5	37	1
Long Branch	Dyna-Gro Seed	HRW	84.4	55.1	35	5
Antero	PlainsGold	HWW	84.1	55.1	39	1
Sunshine	PlainsGold	HWW	83.7	53.9	37	2
SY Wolf	AgnPro Syngenta	HRW	83.5	57.3	35	1
Byrd	PlainsGold	HRW	82.8	55.6	37	2
Avery	PlainsGold	HRW	82.2	55.5	38	4
AM Eastwood	AgnMaxx Wheat	HRW	81.9	54.9	32	2
Langin	PlainsGold	HRW	81.3	55.6	36	4
LCS Mint	Limagrain Cereal Seeds	HRW	80.9	58.1	35	1
Brawl CL Plus	PlainsGold	HRW	80.7	56.0	38	1
WB-Grainfield	WestBred Monsanto	HRW	80.3	55.3	36	1
SY Rugged	AgnPro Syngenta	HRW	78.7	54.2	34	3
Snowmass	PlainsGold	HWW	78.4	55.9	39	2
Winterhawk	WestBred Monsanto	HRW	77.2	56.1	37	1
Oakley CL	Kansas Wheat Alliance	HRW	75.0	53.9	36	2
SY Legend CL2	AgnPro Syngenta	HRW	72.3	54.4	34	3
Hatcher	PlainsGold	HRW	71.2	54.0	37	2
Incline AX	PlainsGold	HRW	69.7	50.9	35	1

Table 6 continues....

Table 6 continued

Variety	Brand/Source	Market Class	Yield bu/ac	Test Weight lb/bu	Plant Height in	Lodging score (1-9) ^a
Experimentals						
CO13D1299	Colorado State University exp.	HWW	93.7	55.0	33	1
CO13D1479	Colorado State University exp.	HWW	92.4	57.1	38	1
CO13D1383	Colorado State University exp.	HWW	90.9	55.1	37	2
CO15D129R	Colorado State University exp.	HRW	87.2	59.0	35	3
CO15A018	Colorado State University exp.	HRW	86.7	54.3	35	2
CO14A136	Colorado State University exp.	HRW	86.4	57.0	37	1
CO12D1770	Colorado State University exp.	HRW	86.4	54.2	33	2
CO15D130W	Colorado State University exp.	HWW	86.1	54.1	34	2
CO15D092R	Colorado State University exp.	HRW	85.5	53.8	36	2
CO13D1486	Colorado State University exp.	HWW	84.9	54.9	36	1
CO15D027RC	Colorado State University exp.	HRW	83.5	56.0	39	1
CO12D296	Colorado State University exp.	HRW	83.2	56.3	35	1
CO15SFD095	Colorado State University exp.	HRW	83.1	58.6	36	2
CO14A050	Colorado State University exp.	HRW	82.4	58.0	38	3
CO15SFD092	Colorado State University exp.	HRW	82.1	56.3	36	2
CO13007	Colorado State University exp.	HRW	82.0	55.5	37	2
CO15D063RC	Colorado State University exp.	HRW	81.8	55.5	37	1
CO13D1638	Colorado State University exp.	HWW	81.5	54.2	38	2
CO15D094R	Colorado State University exp.	HRW	81.1	57.6	37	1
CO13D1714	Colorado State University exp.	HWW	79.8	55.0	38	2
CO15SFD107	Colorado State University exp.	HRW	79.8	57.1	37	2
CO14A070	Colorado State University exp.	HRW	79.6	54.3	37	2
CO13003C	Colorado State University exp.	HRW	79.5	54.5	36	2
CO15D098R	Colorado State University exp.	HRW	79.1	55.9	40	1
CO13D1783	Colorado State University exp.	HRW	79.0	53.0	37	4
CO15D127R	Colorado State University exp.	HRW	78.5	55.9	39	2
CO15SFD061	Colorado State University exp.	HRW	78.3	53.4	38	5
CO13D1164	Colorado State University exp.	HWW	78.1	55.4	38	1
CO12D597	Colorado State University exp.	HRW	77.1	55.0	37	3
CO13D0787	Colorado State University exp.	HRW	76.2	55.4	33	2
NHH144913-3	University of Nebraska exp.	HRW	75.1	51.5	37	1
	Average		82.0	55.4	37	2
	^b LSD (P<0.30)		4.0			

^aLodging score: 1 equals no lodging and 9 equals severe lodging.

^bIf the difference between two variety yields equals or exceeds the LSD value, there is a 70% chance the difference is significant. Variety yields in bold are in the top LSD group.

Site Information

Cooperator: Barry Hinkhouse
 Harvest date: July 1, 2018
 Planting date: September 20, 2017
 Fertilizer: Pre-Plant: N at 70 lb/ac; Starter: N at 8 lb/ac and P at 28 lb/ac; Mid-season: N at 20 lb/ac
 Trial Comments: Planted into marginal moisture, but trial received 1.2" of rain within a week of planting. Trial characterized by above-average stands and early tillering by November. Received moisture in late-January (6" of snow) and again in mid-March and April. Well above-average tillering and growth by the end of March. Trial showed lush growth and was heavily tillered in early May through early June. No disease noted.

Table 7. 2018 Limited-Irrigation Confection Sunflower Variety Performance Trial at Burlington*by Jerry Johnson, Sally Jones-Diamond, and Ed Asfeld*

Brand	Hybrid	Technology	Yield ^c	2-Year		Test	Plant	Population
		Traits ^b		Avg. Yield	Moisture	Weight	Height	
			lb/ac	lb/ac	percent	lb/bu	in	plants/ac
Red River Commodities, Inc	RRC 2414	N/A	3922	-	13.2	17.5	72	15,329
SunOpta	9590	N/A	3517	-	11.8	17.0	62	16,501
Nuseed	5009	N/A	3287	3261	11.4	19.5	45	12,569
Nuseed	4334	Clearfield	3220	3419	12.0	17.6	60	15,811
Red River Commodities, Inc	RRC 2310	N/A	3210	-	13.0	18.4	70	16,511
SunOpta	9521	N/A	3042	-	11.9	18.7	52	13,636
Red River Commodities, Inc	RRC 2319	N/A	2897	-	11.3	16.1	60	14,743
SunOpta	9569	N/A	2850	-	12.0	18.2	41	15,043
Valia Genetics	Valia 41	N/A	2697	2928	11.9	18.8	55	16,802
Valia Genetics	H9811 EXP	N/A	2626	-	11.1	18.4	46	16,262
Red River Commodities, Inc	EXP 05	Clearfield Plus	2623	-	12.7	15.3	47	14,839
SunOpta	9579	N/A	2619	-	11.1	18.4	50	16,030
Nuseed	NSKM65891	N/A	2563	-	13.0	18.2	56	14,738
Nuseed	Panther DMR	DM	2488	2467	11.4	19.9	42	17,134
Nuseed	NSKM65802	N/A	2424	-	13.2	16.2	38	15,898
Valia Genetics	Valia 73	N/A	2360	-	11.3	17.6	52	14,256
Red River Commodities, Inc	RRC 2215	N/A	2333	2947	11.6	18.2	45	14,995
SunOpta	9549	N/A	2318	-	10.7	16.8	41	17,714
Average			2833	3005	11.9	17.8	52	15,489
^d LSD (P<0.30)			376					
^d LSD (P<0.05)			722					
Coefficient of Variation (%)			18.2					

^aOil type designations: HO=High oleic; NS=NuSun/Mid-oleic.^bTechnology trait designations: Clearfield and Clearfield Plus=tolerant to Beyond herbicide; DM=downy mildew resistance; ExpressSun=tolerant to Express herbicide; N/A=no technology traits.^cYield and oil content were corrected to 10% moisture at harvest.^dIf the difference between two hybrid yields equals or exceeds the LSD value, there is a 70% chance (P<0.30) or 95% chance (P<0.05) the difference is significant.**Site Information**

Collaborator:	Gerhard Heintges
Planting Date:	June 5, 2018
Harvest Date:	November 1, 2018
Fertilizer:	N at 120 and P at 35 lb/ac
Herbicide:	Authority Elite at 19 oz/ac
Insecticide:	Prevathon at 20 oz/ac applied 8/7/2018 and Mustang Maxx at 4 oz/ac on 8/23/2018
Irrigation:	Center-pivot
Soil Type:	Colby loam

Table 8. 2018 Limited-Irrigation Oil Sunflower Variety Performance Trial at Burlington*by Jerry Johnson, Sally Jones-Diamond, and Ed Asfeld*

Brand	Hybrid	Oil Type ^a	Technology Traits ^b	Yield ^c lb/ac	2-Year	Moisture percent	Test	Plant	Population plants/ac
					Avg. Yield lb/ac		Weight lb/bu	Height in	
Croplan	568 CL HO	HO	Clearfield, DM	3507	3455	11.0	28.7	59	18,586
Nuseed	N4HM521	HO	Clearfield, DM	3466	3288	11.1	27.1	52	21,158
Dyna-Gro	DG H48HO15 CL	HO	Clearfield, DM	3396	-	10.9	27.8	52	18,295
Croplan	545 CL	NS	Clearfield, DM	3325	3342	11.6	29.5	48	18,606
Dyna-Gro	DG H49HO19 CL	HO	Clearfield, DM	3298	-	11.5	29.1	51	20,618
Allegiant	70H51CL	HO	Clearfield, DM	3264	-	10.7	27.9	55	20,909
Dyna-Gro	DG H49NS14 CL	NS	Clearfield, DM	3221	-	11.3	30.3	49	17,747
Croplan	549 CL	NS	Clearfield, DM	3021	2983	10.8	29.8	64	19,332
Nuseed	Hornet	HO	Clearfield, DM	2939	2949	10.7	29.5	58	17,811
Croplan	3845 HO	HO	N/A	2887	2797	10.3	28.3	59	18,107
Nuseed	NHKP53383	HO	Clearfield Plus, DM	2851	-	11.2	28.5	53	22,236
Dyna-Gro	XH81H50CL	HO	Clearfield	2791	-	11.3	29.1	58	19,747
Dyna-Gro	XH81N48EX	NS	ExpressSun	2738	-	10.6	30.7	53	21,914
Nuseed	NHKM34006	HO	Clearfield, DM	2667	-	11.0	28.1	58	22,825
Croplan	455 E HO	HO	ExpressSun, DM	2650	2528	11.0	29.5	50	20,909
Croplan	557 CL HO	HO	Clearfield, DM	2645	-	11.6	29.3	59	15,939
Dyna-Gro	DG H44HO12 CL	HO	Clearfield, DM	2578	-	10.5	28.9	45	20,764
Croplan	432 E	NS	ExpressSun, DM	2571	2721	10.5	29.9	58	22,942
Allegiant	65H81CL	HO	Clearfield, DM	2485	-	10.3	29.0	54	21,215
Dyna-Gro	DG H45NS16 CL	NS	Clearfield, DM	2391	-	10.6	29.8	52	22,942
Nuseed	N4HP470	HO	Clearfield Plus, DM	2345	-	10.8	30.4	58	19,554
Nuseed	N4HM354	NS	Clearfield, DM	2110	2544	10.5	30.1	52	20,457
Croplan	3732	NS	N/A	2088	2557	10.8	29.1	54	17,489
Nuseed	N4HE302	HO	ExpressSun	2045	-	10.9	27.5	55	19,747
Dyna-Gro	XH81N46EX	NS	ExpressSun	1590	-	11.2	28.1	55	21,909
Dyna-Gro	XH81H51EX	HO	ExpressSun	733	-	10.8	25.7	37	20,005
Average				2677	2916	10.9	28.9	54	20,068
^d LSD (P<0.30)				258					
^d LSD (P<0.05)				493					
Coefficient of Variation (%)				15.8					

^aOil type designations: HO=High oleic; NS=NuSun/Mid-oleic.^bTechnology trait designations: Clearfield and Clearfield Plus=tolerant to Beyond herbicide; DM=downy mildew resistance; ExpressSun=tolerant to Express herbicide; N/A=no technology traits.^cYield and oil content were corrected to 10% moisture at harvest.^dIf the difference between two hybrid yields equals or exceeds the LSD value, there is a 70% chance (P<0.30) or 95% chance (P<0.05) the difference is significant.**Site Information**

Collaborator: Gerhard Heintges

Planting Date: June 5, 2018

Harvest Date: November 1, 2018

Fertilizer: N at 120 and P at 35 lb/ac

Herbicide: Authority Elite at 19 oz/ac

Insecticide: Prevathon at 20 oz/ac applied 8/7/2018 and Mustang Maxx at 4 oz/ac on 8/23/2018

Irrigation: Center-pivot

Soil Type: Colby loam

Table 9. 2018 Irrigated Oil Sunflower Variety Performance Trial at Prospect Valley

by Jerry Johnson, Sally Jones-Diamond, and Ed Asfeld

Brand	Hybrid	Oil Type ^a	Technology Traits ^b	Yield ^c lb/ac	2-Year		Test Weight lb/bu	Plant Height in	Population plants/ac	Oil Content ^d percent
					Avg. Yield lb/ac	Moisture percent				
Croplan	549 CL	NS	Clearfield, DM	2928	2936	10.8	32.1	60	17,134	39.9
Nuseed	NHKP53383	HO	Clearfield Plus, DM	2747	-	12.0	30.1	36	17,134	39.2
Croplan	545 CL	NS	Clearfield, DM	2667	3013	11.8	31.4	46	13,358	39.4
Dyna-Gro	XH81N48EX	NS	ExpressSun	2571	-	10.6	32.4	44	19,747	40.0
Dyna-Gro	XH82N62EX	NS	ExpressSun	2568	-	11.1	32.0	47	18,295	39.8
Nuseed	Hommet	HO	Clearfield, DM	2470	2715	11.0	31.2	48	17,424	40.9
Dyna-Gro	DG H49NS14 CL	NS	Clearfield, DM	2358	-	11.2	31.2	48	13,068	40.5
Dyna-Gro	XH82H65EX	HO	ExpressSun	2287	-	11.1	31.5	54	19,166	39.9
Croplan	455 E HO	HO	ExpressSun, DM	2273	2340	11.0	31.3	52	17,424	39.4
Croplan	568 CL HO	HO	Clearfield, DM	2210	2807	11.3	30.5	43	15,972	42.8
Dyna-Gro	DG H48HO15 CL	HO	Clearfield, DM	2146	-	11.1	31.2	50	13,358	42.1
Dyna-Gro	DG H49HO19 CL	HO	Clearfield, DM	2123	-	10.9	31.0	44	14,520	41.2
Allegiant	70H51CL	HO	Clearfield, DM	2109	-	11.4	31.4	51	17,714	43.5
Dyna-Gro	XH81H53EX	HO	ExpressSun	2081	-	10.8	30.3	49	16,262	41.8
Dyna-Gro	XH81H52CP	HO	Clearfield Plus	2077	-	11.7	32.0	49	16,843	42.7
Nuseed	N4HP470	HO	Clearfield Plus, DM	2071	-	11.5	32.6	48	14,810	42.3
Dyna-Gro	XH82H63EX	HO	ExpressSun	2033	-	11.4	32.0	50	14,810	38.9
Croplan	3845 HO	HO	N/A	2017	2362	10.8	32.0	48	14,810	43.0
Nuseed	N4HM521	HO	Clearfield, DM	1942	2525	10.8	30.4	44	15,682	42.9
Nuseed	NHKM34006	HO	Clearfield, DM	1895	-	10.7	31.5	44	18,295	40.9
Croplan	432 E	NS	ExpressSun, DM	1842	2357	10.6	31.0	55	19,166	37.6
Dyna-Gro	XH82N64EX	NS	ExpressSun	1772	-	10.5	31.7	54	19,457	-
Croplan	3732	NS	N/A	1732	2378	11.4	31.3	47	13,649	41.9
Nuseed	N4HE302	HO	ExpressSun	1719	-	10.8	30.1	47	17,424	39.4
Nuseed	N4HM354	NS	Clearfield, DM	1700	2338	11.1	31.9	46	18,295	42.0
Dyna-Gro	XH81H50CL	HO	Clearfield	1676	-	11.1	31.2	48	18,876	40.4
Allegiant	65H81CL	HO	Clearfield, DM	1626	-	10.7	31.4	40	19,747	41.7
Dyna-Gro	DG H45NS16 CL	NS	Clearfield, DM	1617	-	11.1	31.7	42	16,843	40.5
Croplan	557 CL HO	HO	Clearfield, DM	1604	-	12.1	30.9	45	14,053	39.7
Dyna-Gro	DG H44HO12 CL	HO	Clearfield, DM	1529	-	10.9	31.1	54	19,747	41.9
Dyna-Gro	XH81N46EX	NS	ExpressSun	1485	-	11.4	30.0	52	18,586	39.6
Dyna-Gro	XH81H51EX	HO	ExpressSun	514	-	8.4	30.9	32	17,134	39.2
Average				2012	2577	11.0	31.3	47	16,838	40.9
^d LSD (P<0.30)				229						
^d LSD (P<0.05)				436						
Coefficient of Variation (%)				15.8						

^aOil type designations: HO=High oleic; NS=NuSun/Mid-oleic.^bTechnology trait designations: Clearfield and Clearfield Plus=tolerant to Beyond herbicide; DM=downy mildew resistance; ExpressSun=tolerant to Express herbicide; N/A=no technology traits.^cYield and oil content were corrected to 10% moisture at harvest.^dIf the difference between two hybrid yields equals or exceeds the LSD value, there is a 70% chance (P<0.30) or 95% chance (P<0.05) the difference is significant.**Site Information**

Collaborator: Leon Zimbelman

Planting Date: June 2, 2018

Harvest Date: November 3, 2018

Fertilizer: N at 120 lb/ac

Herbicide: Sonolan at 3 pt/ac

Insecticide: Warrior at 1.9 oz/ac and Lorsban at 0.67 pt/ac

Irrigation: Furrow irrigation

Soil Type: Colby loam

Table 10. 2018 Dryland Grain Sorghum Variety Performance Trial at Akron

by Jerry Johnson, Sally Jones-Diamond, Ed Asfeld, and Merle Vigil

Brand	Hybrid	Grain		Test Weight	Harvest Plant Population	Plant Height	50% Bloom	Lodging	Maturity	
		Yield ^a	Yield						Group ^b	Grain Color
		bu/ac	% of test avg.	lb/bu	plants/ac	in	days after planting	percent		
Dekalb	DKS28-05	106.4	126%	51.4	55,176	46	75	0	E	Bronze
Dyna-Gro Seed	GX17912	103.6	123%	51.8	51,982	47	79	6	E	Cream
BH Genetics	XPS 1712C	102.7	122%	50.4	54,014	44	80	0	E	Cream
Channel	5B27	94.5	112%	53.7	56,047	42	71	6	VE	Bronze
Dyna-Gro Seed	GX17914	93.7	111%	50.9	51,110	47	83	4	ME	Bronze
Dyna-Gro Seed	M59GB57	93.0	110%	53.6	44,722	38	76	0	E	Bronze
Alta	AG1201	92.7	110%	54.2	51,401	38	81	5	ME	Bronze/Red
Browning Seed Inc	Phoenix	92.6	110%	51.9	52,562	45	83	5	ME	Bronze
Dyna-Gro Seed	GX17210	91.2	108%	52.6	33,686	39	85	0	ME	Bronze/Red
Dekalb	DKS33-07	90.8	108%	50.6	50,239	43	88	0	ME	Bronze
Dyna-Gro Seed	GX18919	90.5	107%	50.8	56,047	44	74	0	E	Cream
Dyna-Gro Seed	GX17917	90.4	107%	54.0	43,560	44	76	48	E	Red
Alta	ADV XG629	88.2	104%	55.0	49,949	35	81	0	ME	Cream
BH Genetics	BH 3616	88.1	104%	54.6	56,918	37	79	4	E	Bronze
Dekalb	DKS29-07	87.9	104%	50.7	57,499	44	86	8	ME	Cream
Alta	AG1203	84.2	100%	50.1	41,527	47	89	0	ME	Bronze
Dyna-Gro Seed	M60GB31	82.4	98%	50.6	40,366	46	89	0	ME	Bronze
Alta	ADV G2106	79.9	95%	52.1	36,590	44	81	0	ME	Red
BH Genetics	BH 3400	79.9	95%	53.5	53,434	42	70	21	VE	Bronze
Golden Acres	5875	78.4	93%	54.6	49,078	34	75	0	E	Bronze
Dyna-Gro Seed	M60GB88	77.5	92%	52.5	46,464	46	85	0	ME	Bronze
Alta	ADV XG602	75.3	89%	47.4	49,368	42	92	0	M	Red
S & W Seed Company	SG11670	75.3	89%	53.3	38,914	43	85	0	ME	Bronze
S & W Seed Company	SG11268	73.6	87%	50.8	33,977	47	85	39	M	Red
Dyna-Gro Seed	M71GB01	69.1	82%	53.7	49,078	43	72	55	VE	Dark Bronze
S & W Seed Company	SG11668	67.0	79%	48.9	36,300	46	88	0	ME	Red
Alta	ADV XG251	31.0	37%	42.0	24,103	45	106	4	ML	Red
Average		84.4		51.7	46,819	43	82	8		

^aLSD (P<0.30)

5.4

^aYields adjusted to 14% moisture and hybrids ranked by yield.

^bMaturity group: VE=very early; E=early; ME=medium-early; M=medium; ML=medium-late.

^cIf the difference between two varieties yields equals or exceeds the LSD value, there is a 70% chance the difference is significant.

Site Information

Collaborator: Central Great Plains Research Station

Planting Date: May 18, 2018

Harvest Date: November 6, 2018

Fertilizer: N at 53 and P at 11 lb/ac

Herbicide: Lumax EZ at 1.5 qt/ac, glyphosate at 1 qt/ac, and 2,4-D LV6 at 6 oz/ac applied May 18; Sterling Blue at 8 oz/ac and atrazine 4L at 1.5 pt/ac on June 14; Moxy 2E at 1.5 pt/ac, Sterling Blue at 8 oz/ac, and atrazine 4L at 1.5 pt/ac on July 7

Soil Type: Weld silt loam

Table 11. 2018 Irrigated Corn Variety Performance Trial at Yuma

by Jerry Johnson, Sally Jones-Diamond, and Ed Asfeld

Brand	Hybrid	Insect and Herbicide Technology Traits ^a	Yield ^b bu/ac	2-Year	Relative	Test		
				Avg. Yield bu/ac	Maturity ^c	Moisture percent	Weight lb/bu	Population plants/ac
Pioneer	P0801AM	AM, RR2, LL	316.4	302.1	108	17.4	56.7	32,815
LG Seeds	LG66C32STXRIB	STXRIB, RR2, LL	305.2	-	116	21.7	55.4	33,106
NK Seed	NK1094	N/A	302.2	-	110	17.4	54.7	35,429
B-H Genetics	BH 8121VT2P	VT2Pro, RR2	300.0	-	111	17.3	57.2	31,654
Dyna-Gro Seed	D51VC15	VT2Pro, RR2	297.7	-	111	17.3	57.1	35,719
NuTech/G2 Genetics	5FB-1010	N/A	295.8	-	110	18.2	56.9	34,848
Phoenix	PHX 5352A4	AV3111, RR2, LL	294.0	-	109	19.4	55.3	33,977
B-H Genetics	BH 8399VT2P	VT2Pro, RR2	293.4	282.9	112	19.6	55.5	30,782
Dekalb	DKC60-87RIB	STXRIB, RR2, LL	292.2	265.3	110	19.2	56.5	33,106
NuTech/G2 Genetics	5F-906	AM, RR2, LL	291.2	282.2	106	17.7	57.1	32,234
Dyna-Gro Seed	D52SS63	STX, RR2, LL	289.1	-	112	19.3	55.3	33,686
Allegiant	11395 SS	STXRIB, RR2, LL	286.9	-	113	19.6	55.5	33,686
LG Seeds	LG5643STXRIB	STXRIB, RR2, LL	286.7	-	114	20.8	54.8	32,234
Dyna-Gro Seed	D52SS91	STX, RR2, LL	283.2	276.2	112	21.0	56.0	31,363
Dyna-Gro Seed	D49VC70	VT2Pro, RR2	282.3	-	109	19.1	55.8	32,525
Alta	ADV 1072	AV3111, RR2, LL	282.1	-	107	15.8	56.1	33,396
NK Seed	NK0440	AV3122, RR2	281.9	-	104	16.3	55.7	33,686
LG Seeds	LG61C48STXRIB	STXRIB, RR2, LL	281.9	-	111	19.1	55.6	32,234
NuTech/G2 Genetics	E5FN-A808	N/A	281.3	-	108	16.8	56.5	31,944
Dyna-Gro Seed	D55SS45	STX, RR2, LL	281.0	-	115	21.1	55.7	30,202
Dyna-Gro Seed	D54VC14	VT2Pro, RR2	277.4	-	114	19.1	57.3	31,073
Alta	ADV 1121	N/A	275.5	-	112	17.9	57.1	32,234
NK Seed	NK1354	AV3220, RR2	274.5	-	113	17.8	56.0	30,202
LG Seeds	LG59C41STX	STX, RR2, LL	266.4	-	109	17.1	57.4	31,073
NuTech/G2 Genetics	5F-308	AM, RR2, LL	265.5	270.1	108	17.9	57.9	32,815
LG Seeds	LG59C66VT2PRO	VT2Pro, RR2	258.6	-	109	16.3	59.3	32,234
Dekalb	DKC64-34RIB	STXRIB, RR2, LL	258.4	266.1	114	18.2	57.6	32,815
Dyna-Gro Seed	D48VC76	VT2Pro, RR2	255.1	-	108	17.1	57.5	33,396
NK Seed	NK0821	N/A	253.4	-	108	15.1	56.7	30,202
LG Seeds	LG58C77VT2PRO	VT2Pro, RR2	248.3	-	108	16.0	58.1	29,911
Dyna-Gro Seed	D50VC30	VT2Pro, RR2	247.4	246.4	110	16.1	57.7	36,300
Dyna-Gro Seed	D43VC81	VT2Pro, RR2	246.3	-	103	16.1	57.8	31,363
Dyna-Gro Seed	D44VC36	VT2Pro, RR2	243.5	239.4	104	16.1	58.1	32,525
Dyna-Gro Seed	D43SS50	STXRIB, RR2, LL	237.4	-	103	15.8	59.1	35,719
Dyna-Gro Seed	D45SS65	STXRIB, RR2, LL	233.4	227.7	105	15.9	58.9	33,396
Dyna-Gro Seed	D47VC29	VT2Pro, RR2	229.1	229.3	107	16.3	58.5	31,654
Allegiant	10211 SS	STXRIB, RR2, LL	226.8	-	102	15.0	57.6	31,944
Allegiant	10007 SS	STXRIB, RR2, LL	186.9	-	100	15.1	58.9	25,555
Allegiant	10652 SS	STXRIB, RR2, LL	144.9	-	106	17.5	59.1	19,457
Average			268.0	262.5	109	17.7	56.9	32,115

^dLSD (P<0.30)

13.5

^aTechnology trait designations: AM=Optimum AcreMax; AV3111=Agrisure Viptera 3111; AV3122=Agrisure Viptera 3122 EZ Refuge; AV3220=Agrisure Viptera 3220 EZ Refuge; LL=LibertyLink; N/A=No information available; RR2=Roundup Ready 2; STXRIB=Genuity SmartStax Refuge in the Bag Complete; STX=Genuity SmartStax; VT2Pro=Genuity VecTran Double Protection.

^bYields corrected to 15.5% moisture. Hybrid yields in bold are in the top LSD group.

^cRelative maturity is provided by the respective companies and is the approximate time from planting to harvest maturity.

^dIf the difference between two hybrid yields equals or exceeds the LSD value, there is a 70% chance the difference is significant.

Site Information

Collaborator: Joe Newton
 Planting Date: May 9, 2018
 Harvest Date: October 28, 2018
 Fertilizer: N at 290, P at 30, S at 40 lb/ac plus manure applied at 8 ton/ac
 Herbicide: Early post-emergence: Atrazine at 1.5 pt/ac, glyphosate at 1.5 qt/ac, Zidua at 2 oz/ac, Clarity at 6 oz/ac, and Laudis at 2 oz/ac
 Soil Type: Julesburg loamy sand

Table 12. 2018 Limited Irrigation Corn Variety Performance Trial at Burlington

by Jerry Johnson, Sally Jones-Diamond, and Ed Asfeld

Brand	Hybrid	Insect and Herbicide Technology Traits ^a	Yield ^b bu/ac	2-Year	Relative	Moisture	Test	Plant	Population
				Avg. Yield bu/ac	Maturity ^c		Weight lb/bu	Height in	
Dyna-Gro Seed	D52SS91	STX, RR2, LL	202.6	194.1	112	17.8	57.2	98	32,409
LG Seeds	LG61C48STXRIB	STXRIB, RR2, LL	184.1	-	111	16.1	57.3	102	33,106
NuTech/G2 Genetics	5F-308	AM, RR2, LL	181.2	170.6	108	15.4	58.6	101	35,484
NuTech/G2 Genetics	5F-906	AM, RR2, LL	180.8	188.5	106	15.0	57.8	98	32,409
Dekalb	DKC60-87RIB	STXRIB, RR2, LL	180.6	-	110	15.6	58.2	98	33,454
Dyna-Gro Seed	D52SS63	STX, RR2, LL	180.1	-	112	15.7	57.5	101	32,757
Dyna-Gro Seed	D55SS45	STX, RR2, LL	179.4	-	115	17.8	58.6	99	33,106
LG Seeds	LG5606STXRIB	STXRIB, RR2, LL	179.0	-	111	15.7	59.6	101	33,803
Pioneer	P0801AM	AM, RR2, LL	178.6	-	108	15.1	58.0	93	29,969
Pioneer	P1197AM	AM, RR2, LL	178.0	-	111	15.4	57.8	99	30,318
Dyna-Gro Seed	D54VC14	VT2Pro, RR2	177.3	-	114	17.1	59.0	98	32,409
LG Seeds	LG59C41STX	STX, RR2, LL	176.4	-	109	15.4	58.6	96	31,621
NuTech/G2 Genetics	5FB-1010	N/A	171.6	-	110	16.2	57.9	95	32,757
Dyna-Gro Seed	D50VC30	VT2Pro, RR2	150.0	155.2	110	14.4	58.9	92	31,712
Dyna-Gro Seed	D49VC70	VT2Pro, RR2	148.2	-	109	15.3	58.8	90	32,409
NK Seed	NK1094	N/A	147.9	-	110	14.4	56.6	90	34,848
Dyna-Gro Seed	D51VC15	VT2Pro, RR2	146.6	-	111	14.6	58.5	93	32,060
Dekalb	DKC56-45RIB	STXRIB, RR2, LL	145.9	-	106	14.8	57.7	90	30,870
NuTech/G2 Genetics	E5FN-A808	N/A	142.7	-	108	14.9	57.4	94	31,363
Phoenix	PHX 5352A4	AV3111, RR2, LL	138.0	-	109	14.8	57.9	99	29,969
LG Seeds	LG58C77VT2PRO	VT2Pro, RR2	129.5	-	108	14.5	58.5	97	31,712
Alta	ADV 1072	AV3111, RR2, LL	128.7	-	107	14.5	56.0	95	32,060
Dyna-Gro Seed	D47VC29	VT2Pro, RR2	127.3	141.2	107	14.6	58.7	91	30,666
NK Seed	NK0821	N/A	126.3	-	108	14.4	57.3	97	29,272
NK Seed	NK0440	AV3122, RR2	125.8	-	104	14.2	55.2	98	31,015
Dyna-Gro Seed	D44VC36	VT2Pro, RR2	123.5	139.6	104	14.3	57.8	90	30,666
NK Seed	NK1354	AV3220, RR2	122.8	-	113	15.2	57.2	98	30,318
Dyna-Gro Seed	D45SS65	STXRIB, RR2, LL	108.9	133.1	105	14.7	59.5	90	29,241
LG Seeds	LG59C66VT2PRO	VT2Pro, RR2	107.2	-	109	14.8	60.5	96	28,924
Dyna-Gro Seed	D43VC81	VT2Pro, RR2	91.6	-	103	14.4	57.6	92	27,654
Average			152.0	160.3	109	15.2	58.0		31,612

^aLSD (P<0.30)

9.1

^bTechnology trait designations: AM=Optimum AcreMax; AV3111=Agrisure Viptera 3111; AV3122=Agrisure Viptera 3122 EZ Refuge; AV3220=Agrisure Viptera 3220 EZ Refuge; LL=LibertyLink; N/A=No information available; RR2=Roundup Ready 2; STXRIB=Genuity SmartStax Refuge in the Bag Complete; STX=Genuity SmartStax; VT2Pro=Genuity VecTran Double Protection.

^cYields corrected to 15.5% moisture. Hybrid yields in bold are in the top LSD group.

^dRelative maturity is provided by the respective companies and is the approximate time from planting to harvest maturity.

^eIf the difference between two hybrid yields equals or exceeds the LSD value, there is a 70% chance the difference is significant.

Site Information

Collaborator: Tim Stahlecker
 Planting Date: May 1, 2018
 Harvest Date: October 30, 2018
 Fertilizer: N at 218, P at 60, S at 10, Zn at 1.25 lb/ac
 Herbicide: Post-emergence: glyphosate at 1 qt/ac, Laudis at 3 oz/ac, Clarity at 8 oz/ac, and atrazine at 1 pt/ac
 Soil Type: Kuma-Keith silt loam

Table 13. 2018 Irrigated Corn Variety Performance Trial at Holyoke

by Jerry Johnson, Sally Jones-Diamond, and Ed Asfeld

Brand	Hybrid	Insect and Herbicide Technology Traits ^a	Yield ^b bu/ac	2-Year	Relative	Test		
				Avg. Yield bu/ac	Maturity ^c	Moisture percent	Weight lb/bu	Population plants/ac
AgVenture	EXP186148YHB	INT, RR2 LL	280.8	-	114	17.0	59.1	34,765
Pioneer	P0801AM	AM, RR2, LL	267.0	276.6	108	15.0	58.1	32,525
Dyna-Gro Seed	D51VC15	VT2Pro, RR2	260.9	-	111	15.2	59.0	35,553
NuTech/G2 Genetics	5FB-3113	AMXT, RR2, LL	260.0	-	113	16.0	57.8	34,060
Allegiant	11395 SS	STXRIB, RR2, LL	255.1	-	113	15.3	57.9	36,590
Dyna-Gro Seed	D52SS91	STX, RR2, LL	254.0	253.0	112	15.8	59.3	34,433
NuTech/G2 Genetics	5F-308	AM, RR2, LL	251.8	261.7	108	15.2	59.4	33,769
Dyna-Gro Seed	D52SS63	STX, RR2, LL	246.0	-	112	15.4	57.6	34,765
AgVenture	EXP185138YHB	INT, RR2 LL	244.1	-	113	15.8	57.8	35,657
AgVenture	EXP164048AM	AM, RR2, LL	238.8	-	104	14.5	57.6	32,753
NuTech/G2 Genetics	5FB-6313	N/A	237.2	-	113	15.8	57.4	30,368
NK Seed	NK1094	N/A	234.2	-	110	14.8	57.1	35,138
Dyna-Gro Seed	D49VC70	VT2Pro, RR2	233.2	-	109	14.7	59.1	31,612
AgVenture	EXP178088AM	AM, RR2, LL	230.3	-	108	15.3	58.8	35,201
Dyna-Gro Seed	D48VC76	VT2Pro, RR2	229.3	-	108	14.4	58.9	34,039
Dekalb	DKC60-87RIB	STXRIB, RR2, LL	225.2	-	110	15.1	58.8	34,122
LG Seeds	LG59C41STX	STX, RR2, LL	222.8	-	109	14.7	59.6	33,147
LG Seeds	LG58C77VT2PRO	VT2Pro, RR2	222.1	-	108	14.6	59.2	32,960
NK Seed	NK0440	AV3122, RR2	221.6	-	104	14.2	56.3	32,815
NuTech/G2 Genetics	E5FN-A808	N/A	218.8	-	108	14.9	57.8	30,907
Dekalb	DKC56-45RIB	STXRIB, RR2, LL	216.8	224.0	106	14.7	58.8	32,940
Dyna-Gro Seed	D47VC29	VT2Pro, RR2	213.8	222.2	107	14.3	59.4	31,363
LG Seeds	LG525VT2RIB	VT2PRIB, RR2	210.4	-	105	14.3	59.1	32,981
Dyna-Gro Seed	D50VC30	VT2Pro, RR2	208.9	238.0	110	14.6	58.9	36,259
Dyna-Gro Seed	D45SS65	STXRIB, RR2, LL	207.1	223.8	105	14.5	59.6	35,553
LG Seeds	LG54C01STX	STX, RR2, LL	201.9	-	104	14.2	58.2	31,114
Dyna-Gro Seed	D43SS50	STXRIB, RR2, LL	200.9	-	103	14.4	59.5	36,010
NK Seed	NK0821	N/A	200.3	-	108	14.4	57.6	28,059
Dyna-Gro Seed	D44VC36	VT2Pro, RR2	197.2	215.3	104	14.2	58.4	35,823
Allegiant	10211 SS	STXRIB, RR2, LL	195.5	-	102	14.2	58.3	31,073
NK Seed	NK1354	AV3220, RR2	194.8	-	113	14.7	57.2	28,397
LG Seeds	LG53C50STX	STX, RR2, LL	192.8	-	103	14.4	59.4	32,940
Allegiant	10652 SS	STXRIB, RR2, LL	188.8	-	106	14.7	60.1	27,500
Dyna-Gro Seed	D43VC81	VT2Pro, RR2	174.9	-	103	14.2	58.1	28,252
Average			224.6	239.3	108	14.9	58.5	33,042

^dLSD (P<0.30)

10.9

^aTechnology trait designations: AM=Optimum AcreMax; AMXT=Optimum AcreMax Xtreme; AV3122=Agnisure Viptera 3122 EZ Refuge; AV3220=Agnisure Viptera 3220 EZ Refuge; INT=Optimum IntraSect LL=LibertyLink; N/A=No information available; RR2=Roundup Ready 2; STX=Genuity SmartStax; STXRIB=Genuity SmartStax Refuge in the Bag Complete; VT2PRIB=Genuity VecTran Double Protection Refuge in a Bag; VT2Pro=Genuity VecTran Double Protection.

^bYields corrected to 15.5% moisture. Hybrid yields in bold are in the top LSD group.

^cRelative maturity is provided by the respective companies and is the approximate time from planting to harvest maturity.

^dIf the difference between two hybrid yields equals or exceeds the LSD value, there is a 70% chance the difference is significant.

Site Information

Collaborator: Brent Adler
 Planting Date: April 30, 2018
 Harvest Date: November 6, 2018
 Fertilizer: N at 230, P at 60, K at 60, and S at 30 lb/ac; Starter: N at 3, P at 12, and Zn at 1.5 lb/ac
 Herbicide: Lorsban and Capture
 Soil Type: Julesburg loamy sand
 Trial Coordinates: 40.3584,-102.10662

Table 14. 2018 Irrigated Corn Variety Performance Trial at Wiggins

by Jerry Johnson, Sally Jones-Diamond, and Ed Asfeld

Brand	Hybrid	Insect and Herbicide Technology Traits ^a	Yield ^b bu/ac	2-Year	Relative	Test			Plant
				Avg. Yield bu/ac	Maturity ^c	Moisture percent	Weight lb/bu	Population plants/ac	Height in
NuTech/G2 Genetics	5F-906	AM, RR2, LL	224.8	248.7	106	14.3	57.8	30,633	105
LG Seeds	LG5525VT2RIB	VT2PRIB, RR2	219.3	-	105	14.2	58.9	31,757	96
NuTech/G2 Genetics	5F-308	AM, RR2, LL	214.9	245.9	108	14.7	58.8	31,632	108
Dyna-Gro Seed	D51VC15	VT2Pro, RR2	213.8	-	111	14.7	57.2	29,508	102
Dyna-Gro Seed	D52SS63	STX, RR2, LL	212.4	-	112	14.5	56.9	32,038	106
NK Seed	NK1354	AV3220, RR2	211.2	-	113	14.6	56.6	30,351	97
Dyna-Gro Seed	D49VC70	VT2Pro, RR2	209.8	-	109	14.5	57.9	29,789	101
LG Seeds	LG53C50STX	STX, RR2, LL	203.5	-	103	14.1	58.7	30,820	97
Dyna-Gro Seed	D48VC76	VT2Pro, RR2	202.1	-	108	14.5	57.5	32,558	100
Pioneer	P0801AM	AM, RR2, LL	200.2	237.1	108	14.2	57.8	34,130	107
NK Seed	NK1094	N/A	200.0	-	110	15.1	54.8	32,360	96
Dyna-Gro Seed	D43VC81	VT2Pro, RR2	196.4	-	103	14.2	58.1	30,633	103
Mycogen	2A627	STX, RR2, LL	194.6	-	108	14.7	57.8	33,079	99
LG Seeds	LG59C41STX	STX, RR2, LL	194.0	-	109	14.4	59.7	30,633	96
Dyna-Gro Seed	D41VC71	VT2Pro, RR2	190.7	220.6	102	14.1	58.0	28,665	101
LG Seeds	LG54C01STX	STX, RR2, LL	189.5	-	104	14.1	57.3	30,070	100
NK Seed	NK0440	AV3122, RR2	188.8	-	104	13.9	55.4	30,903	107
LG Seeds	LG58C77VT2PRO	VT2Pro, RR2	187.9	-	108	14.0	58.0	30,070	104
Dyna-Gro Seed	D50VC30	VT2Pro, RR2	187.4	-	110	14.1	58.3	30,633	102
Dyna-Gro Seed	D47VC29	VT2Pro, RR2	184.7	218.0	107	14.2	58.4	30,945	99
Dyna-Gro Seed	D44VC36	VT2Pro, RR2	180.7	202.7	104	14.1	58.5	29,227	99
Allegiant	10007 SS	STXRIB, RR2, LL	177.9	-	100	14.1	59.2	28,894	101
Allegiant	10211 SS	STXRIB, RR2, LL	175.8	-	102	14.0	58.3	32,839	95
NK Seed	NK0821	N/A	175.5	-	108	14.1	56.5	27,822	99
Dekalb	DKC56-45RIB	STXRIB, RR2, LL	173.8	-	106	14.4	57.8	32,475	99
Mycogen	2V489	STX, RR2, LL	171.4	-	101	13.9	55.9	29,789	98
Dyna-Gro Seed	D43SS50	STXRIB, RR2, LL	160.8	-	103	14.2	59.2	33,401	100
Allegiant	10652 SS	STXRIB, RR2, LL	159.5	-	106	14.5	58.6	20,796	101
Dyna-Gro Seed	D45SS65	STXRIB, RR2, LL	156.8	193.8	105	14.0	59.0	31,913	97
Average			191.6	223.8	106	14.3	57.8	30,633	101

^aLSD (P<0.30)

11.8

^bTechnology trait designations: AM=Optimum AcreMax; AV3122=Agrisure Viptera 3122 EZ Refuge; AV3220=Agrisure Viptera 3220 EZ Refuge; INT=Optimum Intrasect LL=LibertyLink; N/A=No information available; RR2=Roundup Ready 2; STX=Genuity SmartStax; STXRIB=Genuity SmartStax Refuge in the Bag Complete; VT2PRIB=Genuity VecTran Double Protection Refuge in a Bag; VT2Pro=Genuity VecTran Double Protection.

^cYields corrected to 15.5% moisture. Hybrid yields in bold are in the top LSD group.

^dRelative maturity is provided by the respective companies and is the approximate time from planting to harvest maturity.

^eIf the difference between two hybrid yields equals or exceeds the LSD value, there is a 70% chance the difference is significant.

Site Information

Collaborator: Cooksey Farms
 Planting Date: May 9, 2018
 Harvest Date: November 5, 2018
 Fertilizer: N at 250, P at 80, K at 20, and S at 30 lb/ac
 Herbicide: Pre-emergence: Glyphosate, Balance Flexx, and atrazine; Mid-season: glyphosate, generic WideMatch
 Soil Type: Heldt clay
 Location Coordinates: 39.993586, 104.10941

Table 15. 2018 Dryland Corn Variety Performance Trial at Akron

by Jerry Johnson, Sally Jones-Diamond, and Ed Asfeld

Brand	Hybrid	Insect and Herbicide Technology Traits ^a	Yield ^b bu/ac	Relative Maturity ^c	Moisture percent	Test	Ear	Population plants/ac
						Weight lb/bu	Height in	
Dyna-Gro Seed	D49VC70	VT2Pro, RR2	73.3	109	14.8	57.8	32	12,632
Dyna-Gro Seed	D37VC64	VT2Pro, RR2	69.1	97	13.7	57.4	30	14,084
NuTech/G2 Genetics	5H-905	HX, RR2, LL	69.1	105	13.3	54.6	33	13,358
Dekalb	DKC51-20RIB	VT2PRIB, RR2	67.2	101	13.4	57.4	31	11,035
Dyna-Gro Seed	D47VC29	VT2Pro, RR2	67.1	107	13.6	58.3	31	12,778
Dyna-Gro Seed	D45SS65	STXRIB, RR2, LL	65.9	105	13.7	59.3	33	13,213
Dyna-Gro Seed	D48VC76	VT2Pro, RR2	65.6	108	14.1	56.4	31	13,068
Dyna-Gro Seed	D41VC71	VT2Pro, RR2	65.3	102	13.6	58.5	34	12,342
Dyna-Gro Seed	D43VC81	VT2Pro, RR2	64.5	103	13.3	57.8	33	12,487
Pioneer	P0801AM	AM, RR2, LL	64.0	108	13.6	57.3	34	12,632
NK Seed	NK0760	AV3111, RR2, LL	63.6	107	13.6	55.2	37	13,213
Dyna-Gro Seed	D39DC43	VT2Pro, RR2	61.9	99	13.1	57.9	31	13,068
NK Seed	NK0199	AV3122, RR2	61.7	101	13.4	58.1	40	13,068
Dyna-Gro Seed	D50VC30	VT2Pro, RR2	60.5	110	14.4	57.4	21	12,342
Allegiant	10211 SS	STXRIB, RR2, LL	60.2	102	13.3	58.4	32	12,487
NuTech/G2 Genetics	5F-601	AM, RR2, LL	58.5	101	13.3	57.7	35	12,052
Allegiant	10007 SS	STXRIB, RR2, LL	58.3	100	13.2	57.7	32	9,728
NuTech/G2 Genetics	E5FN-A604	N/A	58.2	104	13.4	56.4	36	12,923
Dyna-Gro Seed	D44VC36	VT2Pro, RR2	57.0	104	13.2	58.4	32	13,213
NK Seed	NK9535	AV3220, RR2	56.4	95	13.0	57.0	35	13,358
Dyna-Gro Seed	D43SS50	STXRIB, RR2, LL	54.2	103	13.3	59.0	33	12,778
Average			62.9	103	13.5	57.5	32	12,660

^aLSD (P<0.30)

5.4

^bTechnology trait designations: AM=AcreMax; AV3111=Agrisure Viptera 3111; AV3122=Agrisure Viptera 3122 EZ Refuge; AV3220=Agrisure Viptera 3220 EZ Refuge; HX=Hercules I; LL=LibertyLink; N/A=No information available; RR2=Roundup Ready 2; STXRIB=Genuity SmartStax Refuge in the Bag Complete; VT2PRIB=Genuity VecTran Double Protection Refuge in the Bag Complete; VT2Pro=Genuity VecTran Double Protection.

^cYields corrected to 15.5% moisture. Hybrid yields in bold are in the top LSD group.

^dRelative maturity is provided by the respective companies and is the approximate time from planting to harvest maturity. The method of calculation of the relative maturity ratings may vary among companies.

^eIf the difference between two hybrid yields equals or exceeds the LSD value, there is a 70% chance the difference is significant.

Site Information

Collaborator: Central Great Plains Research Center
 Planting Date: May 16, 2018
 Harvest Date: October 22, 2018
 Fertilizer: Starter: N at 3 and P at 11 lb/ac; Pre-plant: N at 49 lb/ac.
 Herbicide: April 25: Lumax EZ at 2.7 qt/ac and Cornerstone Plus at 1 qt/ac; June 14: Cornerstone Plus at 1.5 qt/ac, Atrazine 4L at 1 pt/ac, and Sterling Blue at 2 oz/ac
 Soil Type: Weld Silt Loam

Table 16. 2018 Dryland Corn Variety Performance Trial at Dailey

by Jerry Johnson, Sally Jones-Diamond, and Ed Asfeld

Brand	Hybrid	Insect and Herbicide		Yield ^b	Relative Maturity ^c	Moisture	Test Weight	Population
		Technology	Traits ^a					
Dyna-Gro Seed	D43VC81		VT2Pro, RR2	81.6	103	17.2	53.9	14,520
Dyna-Gro Seed	D41VC71		VT2Pro, RR2	78.6	102	19.2	52.8	13,939
NuTech\G2 Genetics	5H-905		HX, RR2, LL	77.6	105	19.8	51.2	14,520
Dekalb	DKC51-20RIB		VT2PRIB, RR2	74.8	101	14.4	54.2	14,520
NK Seed	NK9535		AV3220, RR2	74.6	95	15.3	55.2	14,520
NK Seed	NK0760		AV3111, RR2, LL	72.7	107	22.8	51.7	15,101
Pioneer	P0801AM		AM, RR2, LL	72.6	108	20.2	54.0	15,101
Dyna-Gro Seed	D44VC36		VT2Pro, RR2	72.1	104	22.0	53.8	15,101
Dyna-Gro Seed	D43SS50		STXRIB, RR2, LL	71.4	103	24.1	53.4	15,101
Dyna-Gro Seed	D48VC76		VT2Pro, RR2	71.3	108	18.7	53.2	13,939
NuTech\G2 Genetics	5F-601		AM, RR2, LL	69.7	101	17.6	55.1	15,101
Dyna-Gro Seed	D39DC43		VT2Pro, RR2	69.4	99	16.5	55.0	14,520
NK Seed	NK0199		AV3122, RR2	69.4	101	18.8	53.8	15,682
Dyna-Gro Seed	D37VC64		VT2Pro, RR2	69.2	97	17.4	55.4	13,939
Dyna-Gro Seed	D50VC30		VT2Pro, RR2	69.1	110	21.6	53.0	15,101
Dyna-Gro Seed	D47VC29		VT2Pro, RR2	68.4	107	15.6	54.6	15,101
NuTech\G2 Genetics	E5FN-A604		N/A	66.5	104	20.6	51.1	15,682
Dyna-Gro Seed	D45SS65		STXRIB, RR2, LL	66.5	105	15.1	55.7	15,101
Dyna-Gro Seed	D49VC70		VT2Pro, RR2	64.8	109	23.3	52.0	15,101
Allegiant	10007 SS		STXRIB, RR2, LL	51.2	100	20.7	54.7	8,131
Average				70.6	103	19.0	53.7	14,491

^dLSD (P<0.30)

5.3

^aTechnology trait designations: AM=Optimum AcreMax; AV3111=Agrisure Viptera 3111; AV3122=Agrisure Viptera 3122 EZ Refuge; AV3220=Agrisure Viptera 3220 EZ Refuge; HX=Herculex I; LL=LibertyLink; N/A = No information available; RR2=Roundup Ready 2; STXRIB=Genuity SmartStax Refuge in the Bag Complete; VT2PRIB=Genuity VecTran Double Protection Refuge in the Bag Complete; VT2Pro=Genuity VecTran Double Protection.

^bYields corrected to 15.5% moisture.^cRelative maturity is provided by the respective companies and is the approximate time from planting to harvest maturity.

The method of calculation of the relative maturity ratings may vary among companies.

^dIf the difference between two hybrid yields equals or exceeds the LSD value, there is a 70% chance the difference is significant.**Site Information**

Collaborator:	Mark and Neal Lambert
Planting Date:	June 4, 2018
Harvest Date:	October 29, 2018
Fertilizer:	Pre-plant: N at 40, P at 23 lb/ac applied as compost. Starter: N at 20, P at 10, and Zn at 0.5 lb/ac
Herbicide:	Preplant: 24 oz/ac Roundup RT3; Post-planting: 24 oz/ac RoundUp PowerMAX, 6 oz/ac DiFlexx, 1.1 lb/ac atrazine
Soil Type:	Haxtun sandy loam
Trial Coordinates:	40.66108, 102.74079

Pest Alert (Pest Survey) in Northeastern Colorado

Assefa Gebre-Amlak

Extension Specialist, Colorado State University Extension

Introduction: Pest alert program monitors field crop pests in alfalfa, corn, dry beans, sunflowers and winter wheat with objectives of providing timely pest management information to citizens of Colorado. Monitoring of alfalfa, dry beans, winter wheat pests is based on field scouts and reports from co-operators, extension offices and producers whereas corn insects (European corn borer and western bean cutworm moths) and sunflower insects (sunflower moths and banded moths) were monitored with insect pheromone (lures) that are commercially available.

The monitoring sites included Akron, Burlington, Eckley, Haxtun, Wauneta and Yuma, however, in 2018, only Akron (Washington County), Burlington, Eckley (Yuma County) and Prospect Valley (Weld County) sites were used. Historic data of other sites from earlier years were included in the current report. Most of the monitoring sites have ten or more years of data and average was used to show the trend and seasonal abundance of the pest in each site.

European corn borer: as can be seen in Figures 1-6, European corn borer moth emergence and flight period was similar in all locations presented in the report. It generally has two generations per year (see two distinct peaks during the growing season) with exception of slight variations in some years and locations.

The first generation moths emerged around the early part of June and peaked between the 2nd and 3rd week of the same month (figures 1-6). Inspection and monitoring for 1st generation should be conducted between the second and last week of June as mean peak population of this generation occurs during this period. Chemical treatment for 1st generation is based on leaf infestation and presence of live larvae; is justified if 25 percent of plants show leaf typical leaf infestations.

Pheromone trap data show that the 2nd generation European corn borer moth emerged during the 1st

week of August and peaked between 2nd and 3rd weeks of the same month (figures 1-6). Second generation moth populations were markedly lower than the 1st generation in all pheromone locations. In general, historic pheromone trap data showed that Burlington, Eckley and Haxtun sites had the largest numbers of European corn borer moth in Colorado.

Long term monitoring of European corn borer in northeastern Colorado showed that the pest was more abundant in areas along the Highway 385 including Burlington, Eckley, Haxtun and Wauneta than Akron or Yuma. However, the same data show a decline in number of the European corn borer moth since 2010 in northeastern Colorado (figure 1-6). This decline probably has to do with increased use of Bt corn in the area.

Western bean cutworm: western bean cutworm moth emerged around the end of June and peak population of the insect was observed around the 3rd week of July and 2nd week of August in Colorado. As can be seen from the monitoring data, western bean cutworm populations in Akron, Haxtun and Eckley were twice the size of other sites including Burlington, Wauneta and Yuma (figures 7-12)

Sunflower Insects: sunflower moths and banded moths were observed between early July and the end of August and population peaks around the 2nd week of August (Figures 13-18). In 2015, both Akron and Burlington had the largest numbers of sunflower moth and followed by two years of lower populations of the moth. In Julesburg, however, it was in 2014 that larger numbers of sunflower head moths were captured in pheromone traps in the area.

Despite the fact that there are more banded sunflower moth populations than sunflower moths in all monitoring sites, it is less important according to Colorado State university field study. The key sunflower head-infesting insects are sunflower moth and sunflower red seed weevils.

European corn borer moth seasonal abundance and flight period in Colorado

Figure 1. European corn borer moth emergence and flight period in Akron, CO (2008-2018)

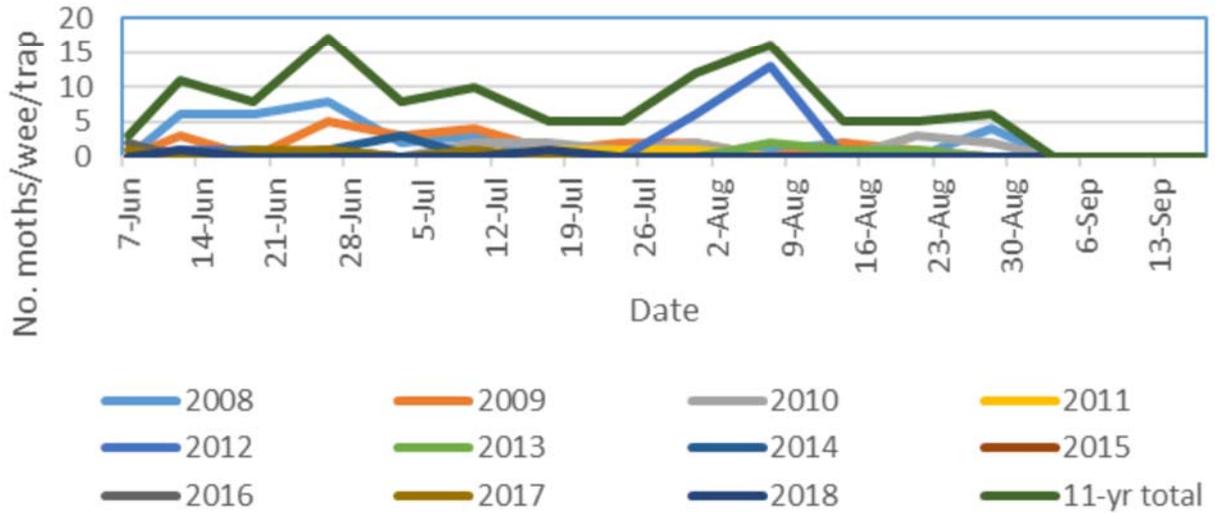


Figure 2. European corn borer moth emergence and flight period in Burlington, CO (2008-2018)

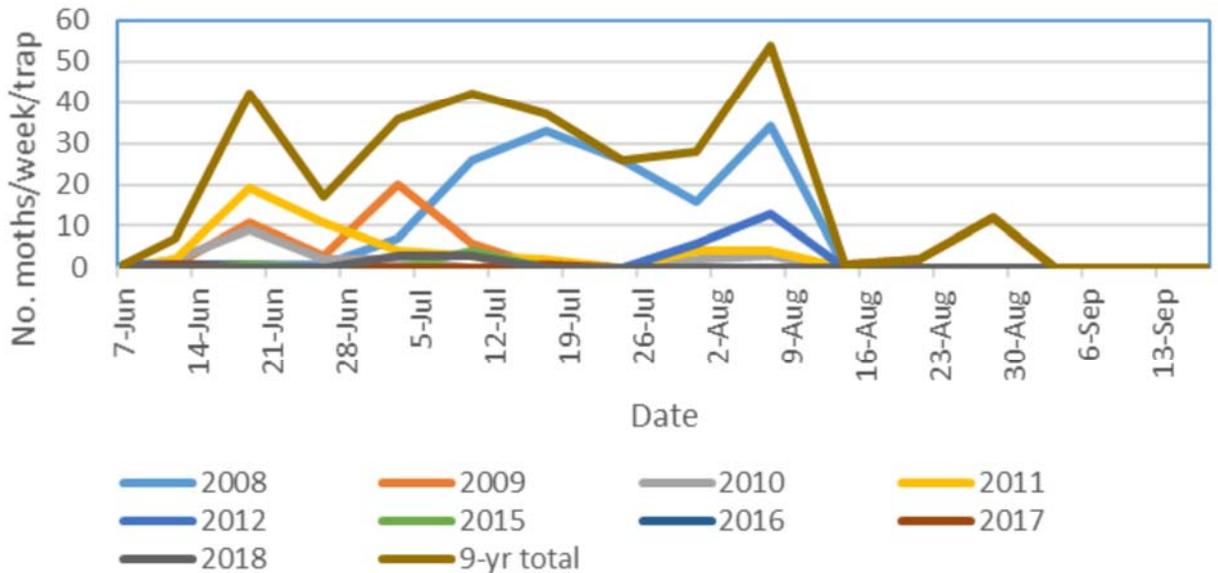


Figure 3. European corn borer emergence and flight period, Eckley, CO (2008-2018)

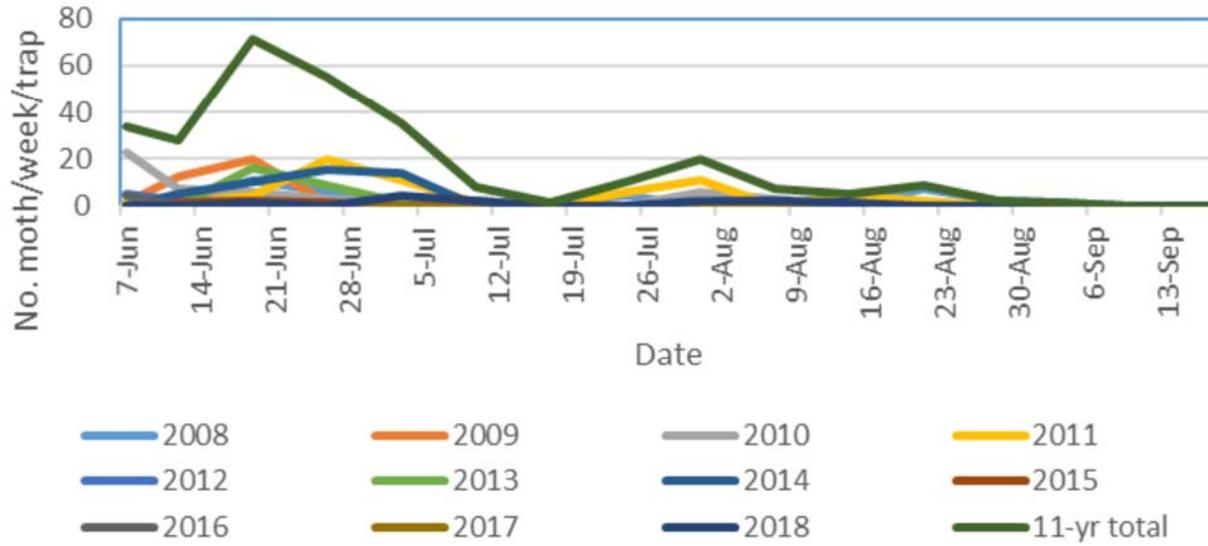


Figure 4. European corn borer moth emergence and flight period in Haxtun, CO (2008-2017)

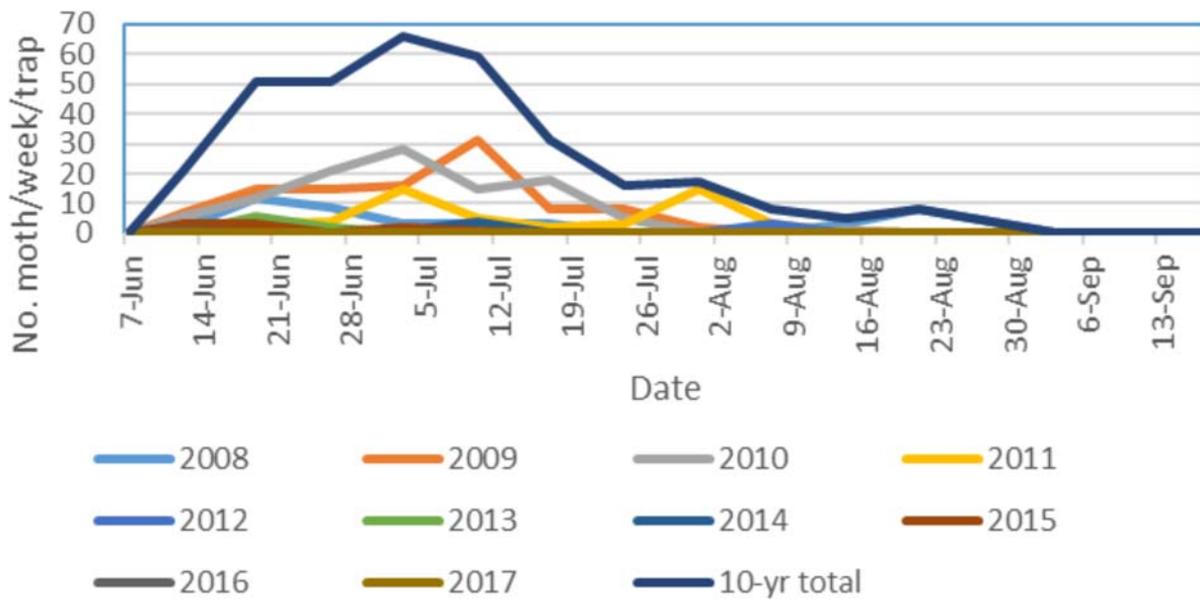


Figure 5. European corn borer moth emergence and flight period in Wauneta, CO (2008-2017)

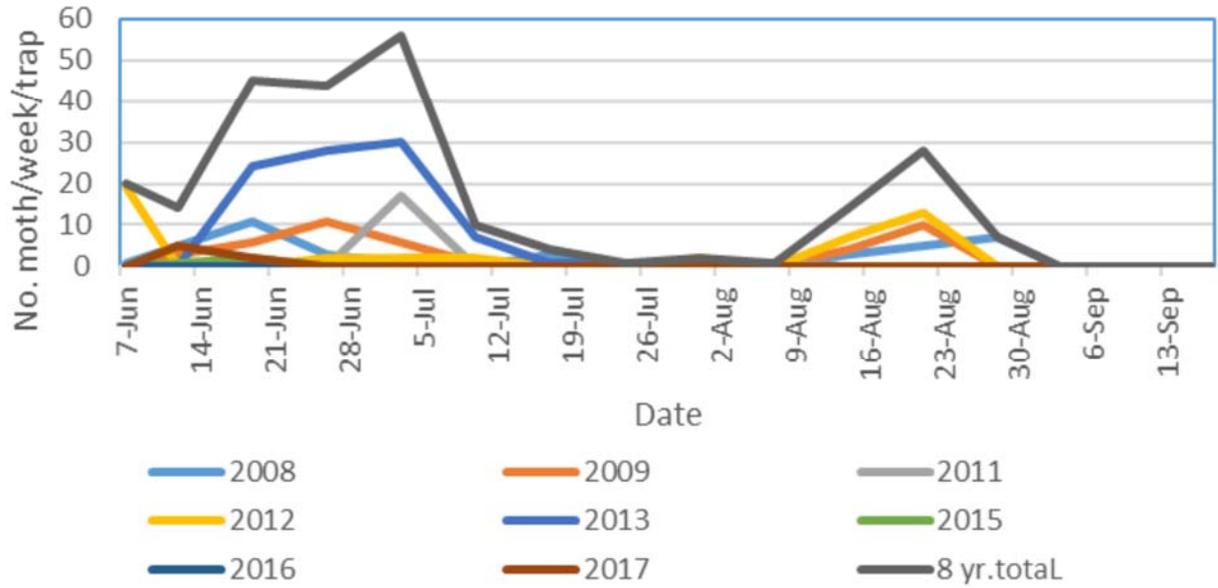
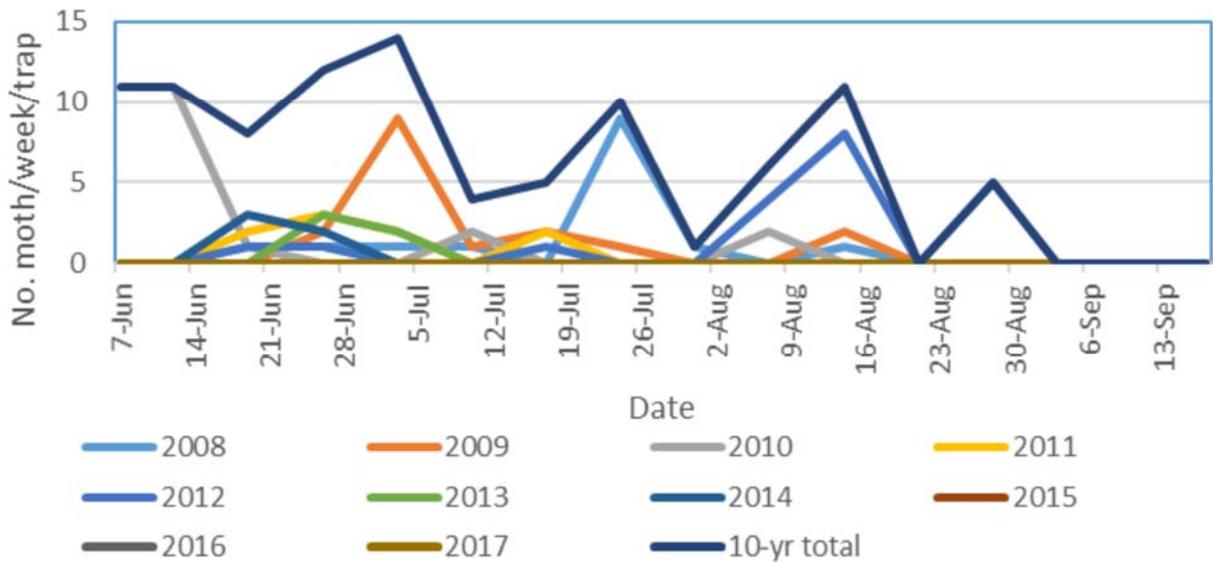


Figure 6. European corn borer emergence and flight period in Yuma, CO (2008-2017)



Western cutworm moth seasonal abundance and flight period in Colorado

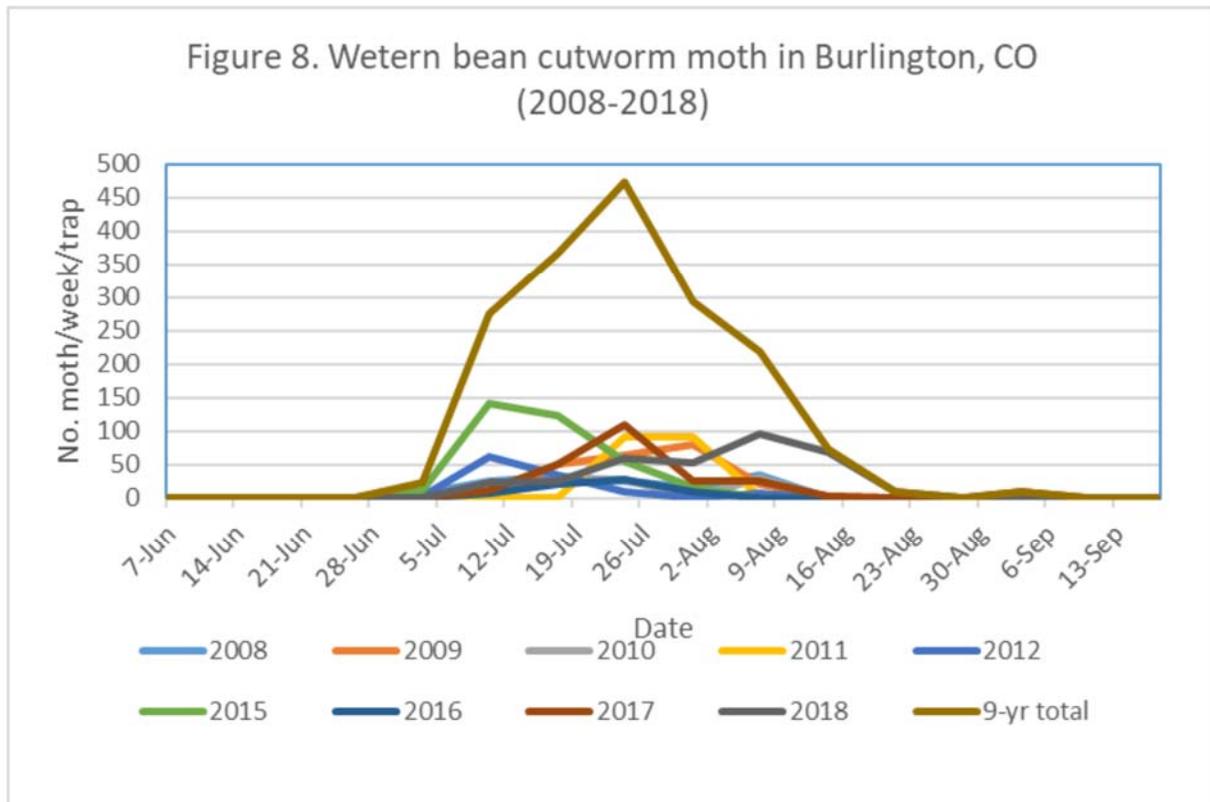
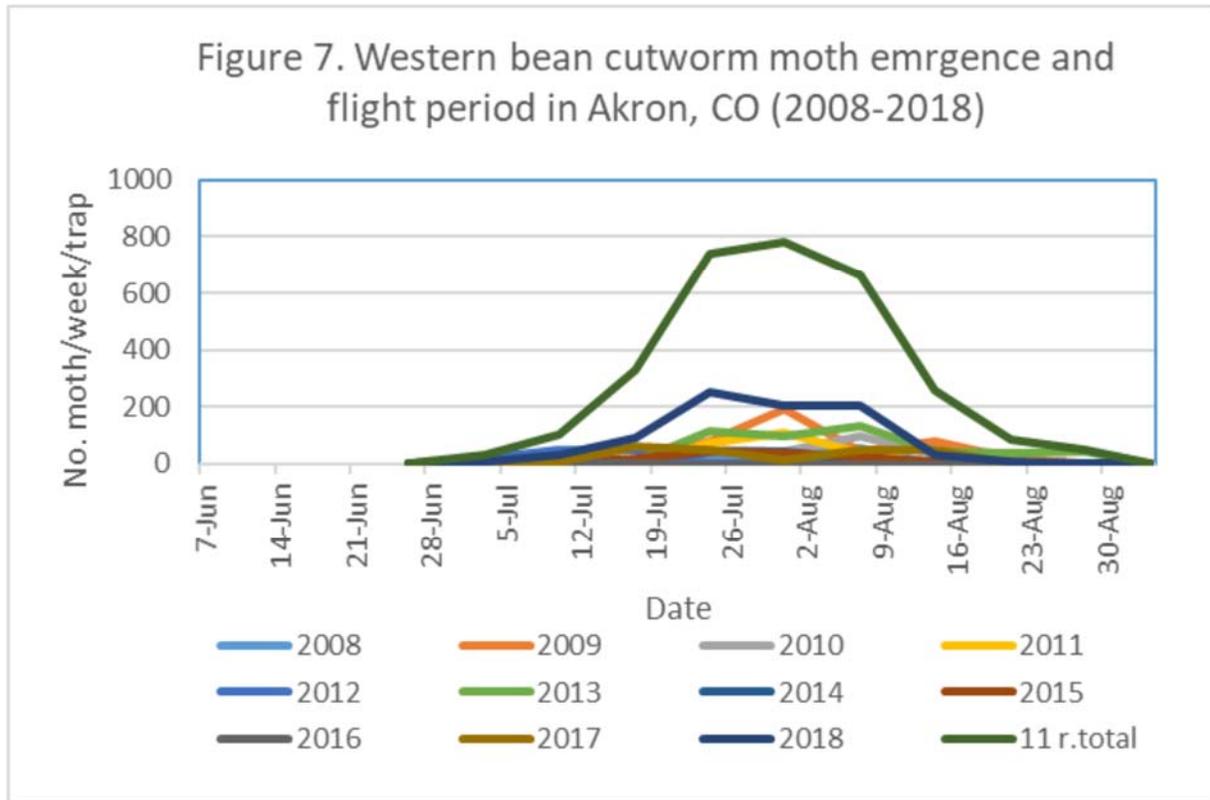


Figure 9. Western bean cutworm moth emergence and flight period in Eckley, CO (2008-2018)

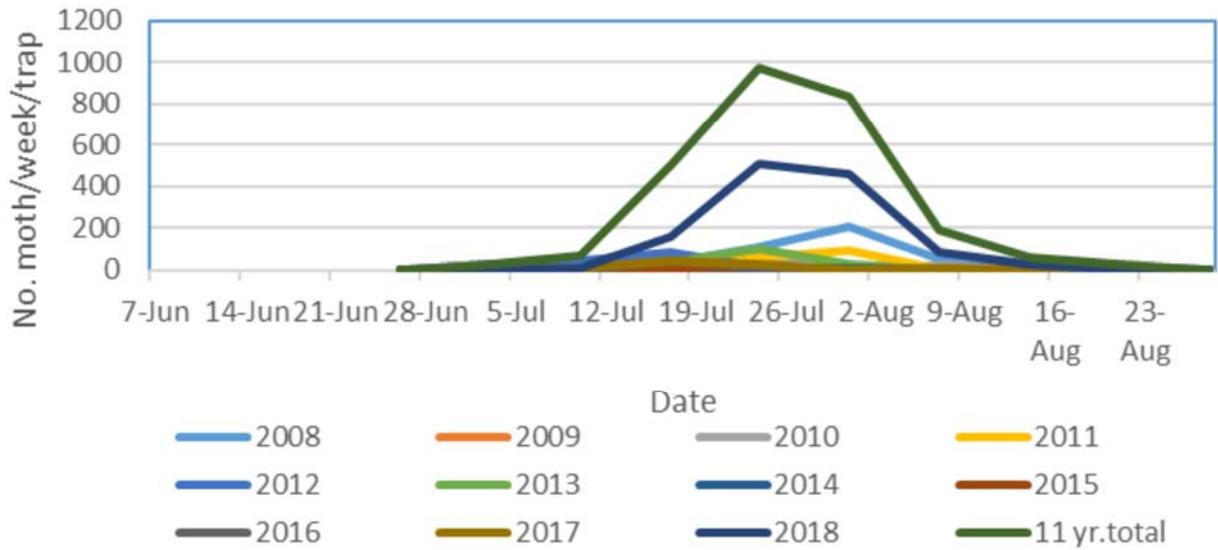


Figure 10. Western bean cutworm moth emergence and flight in Haxtun, CO (2008-2017)

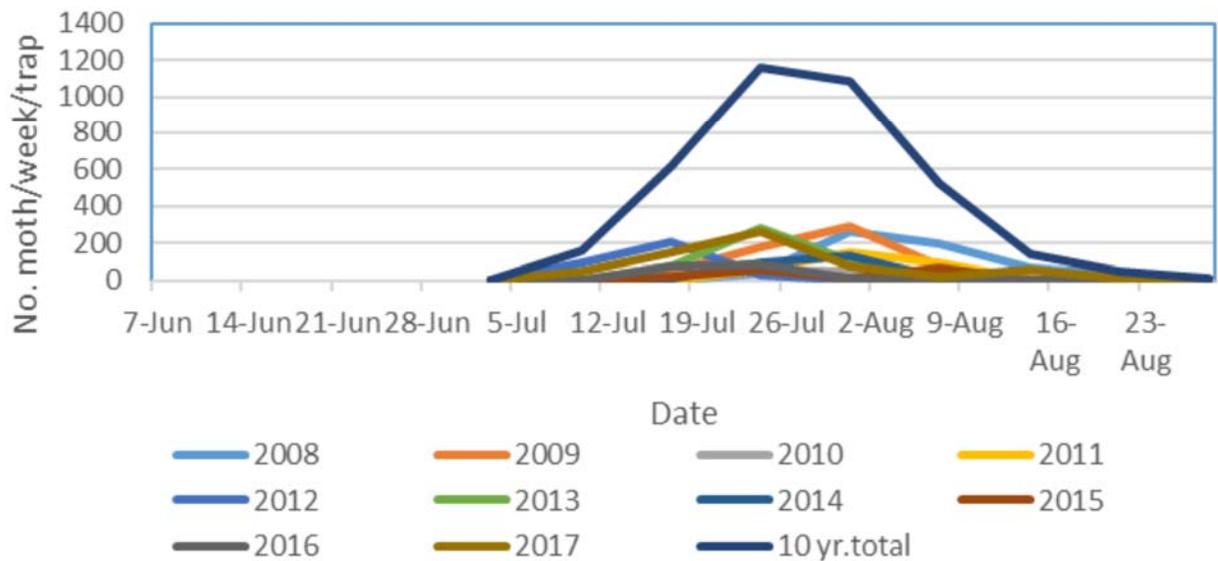


Figure 11. Western bean cutworm moth emergence and flight period in Wauneta, CO (2008-2017)

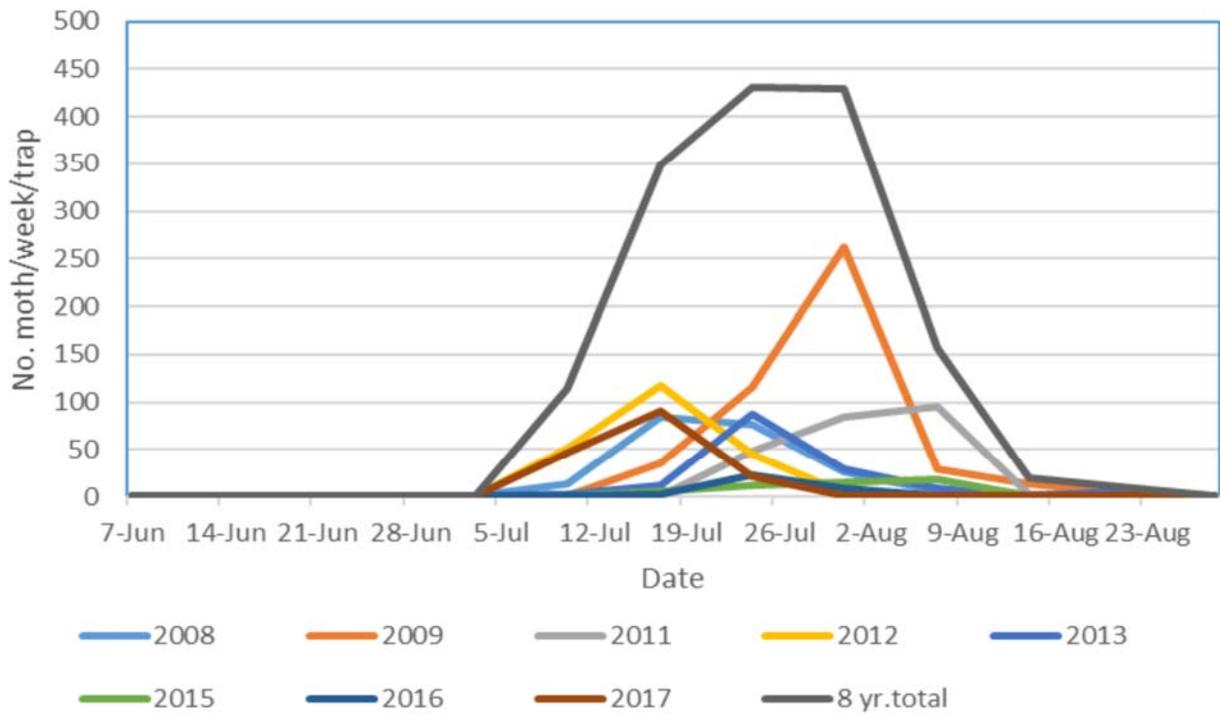
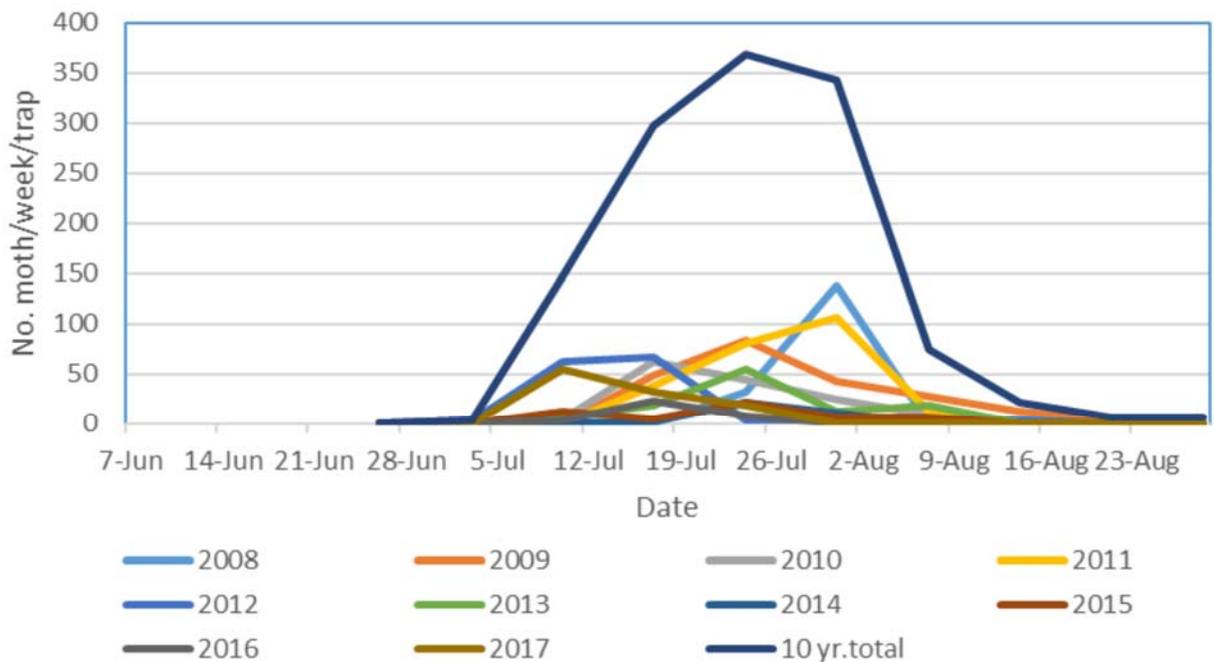


Figure 12. Western bean cutworm emergence and flight period in Yuma, CO (2008-2017)



Sunflower moth and banded moth seasonal abundance flight periods

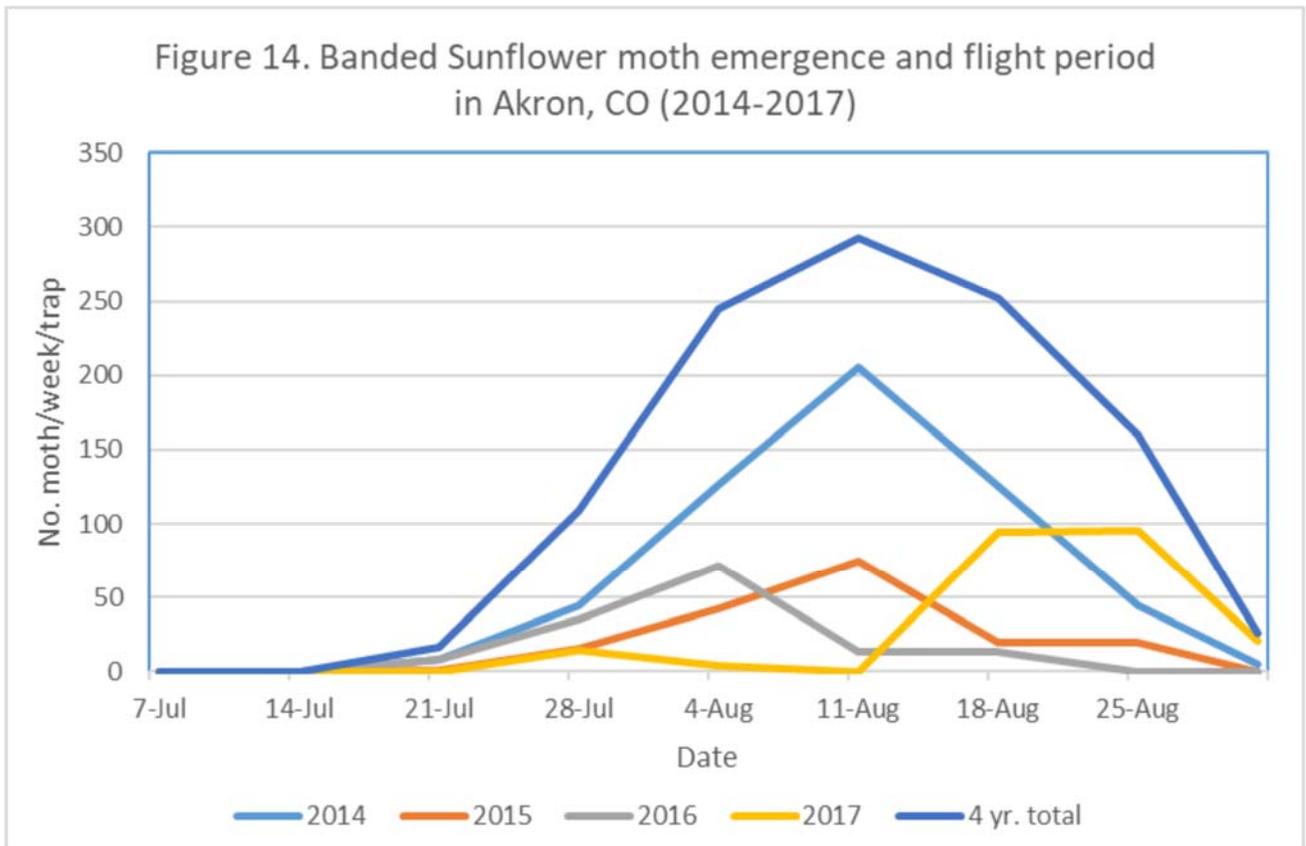
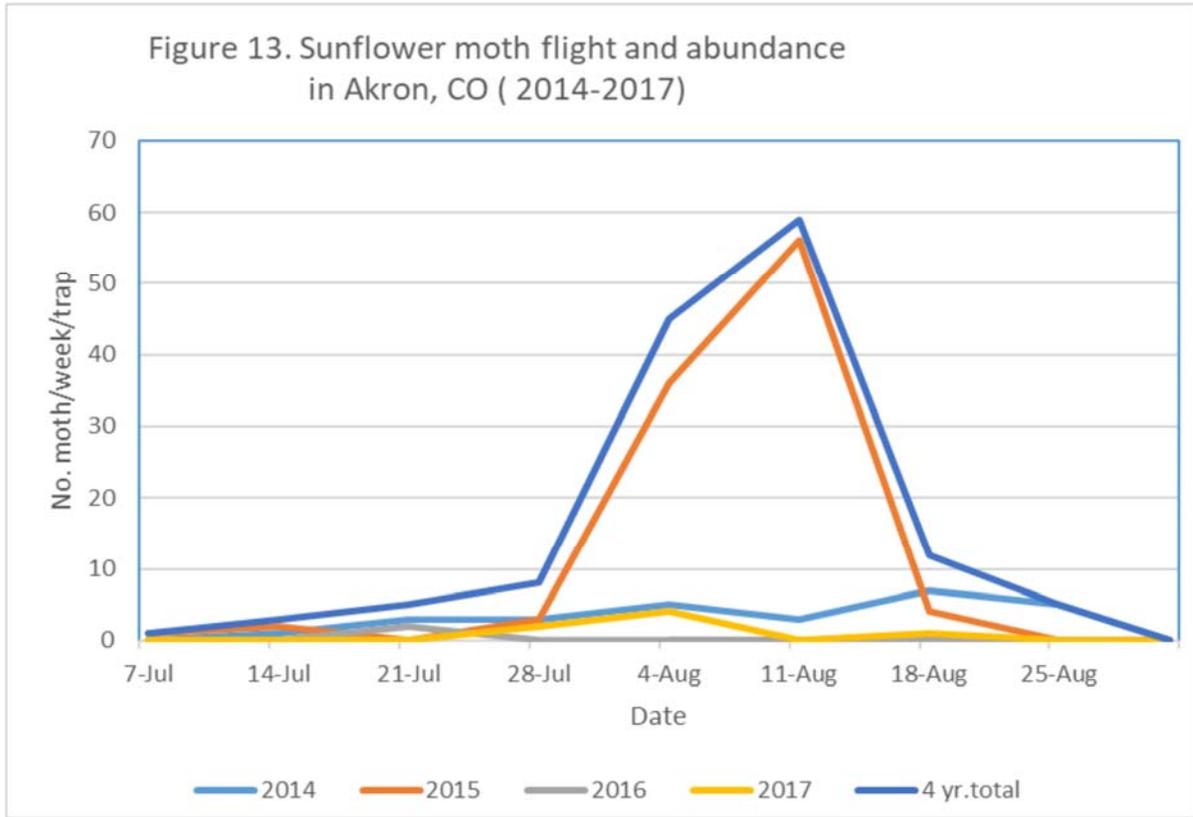


Figure 15. Sunflower moth flight period in Burlington, CO (2014-2018)

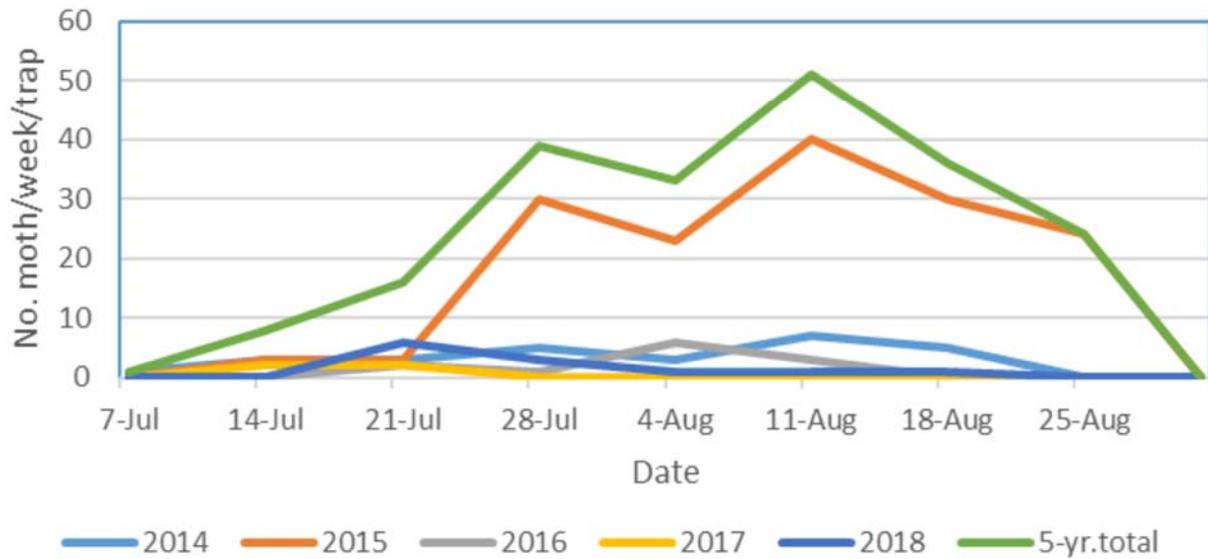


Figure 16. Banded sunflower moth emergence and flight period in Burlington, CO (2014-2018)

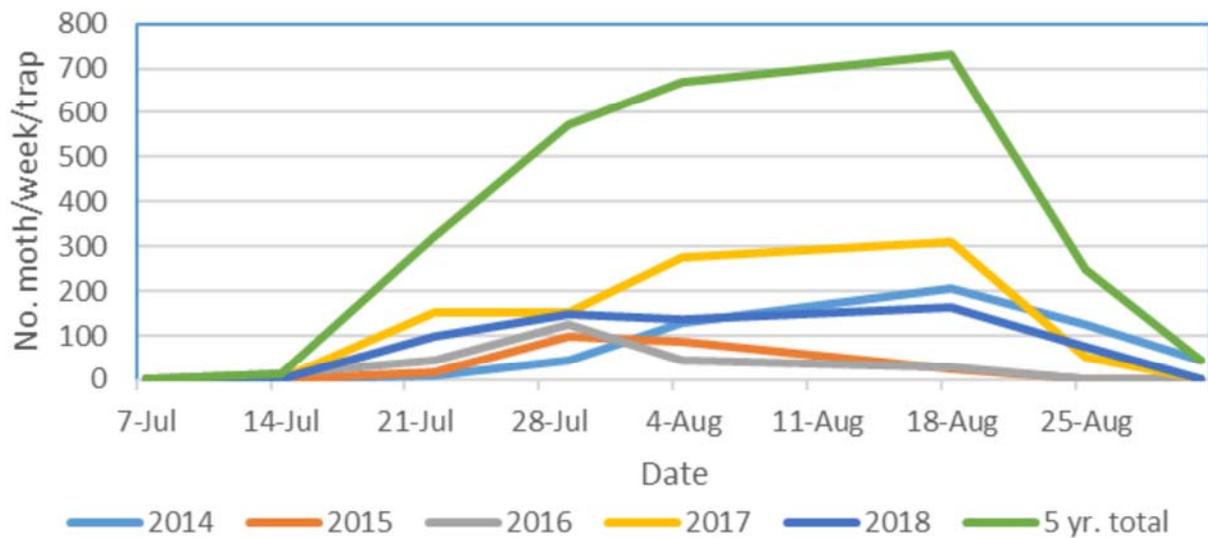


Figure 17. Sunflower moth flight and abundance in Julesburg, CO (2014-2016)

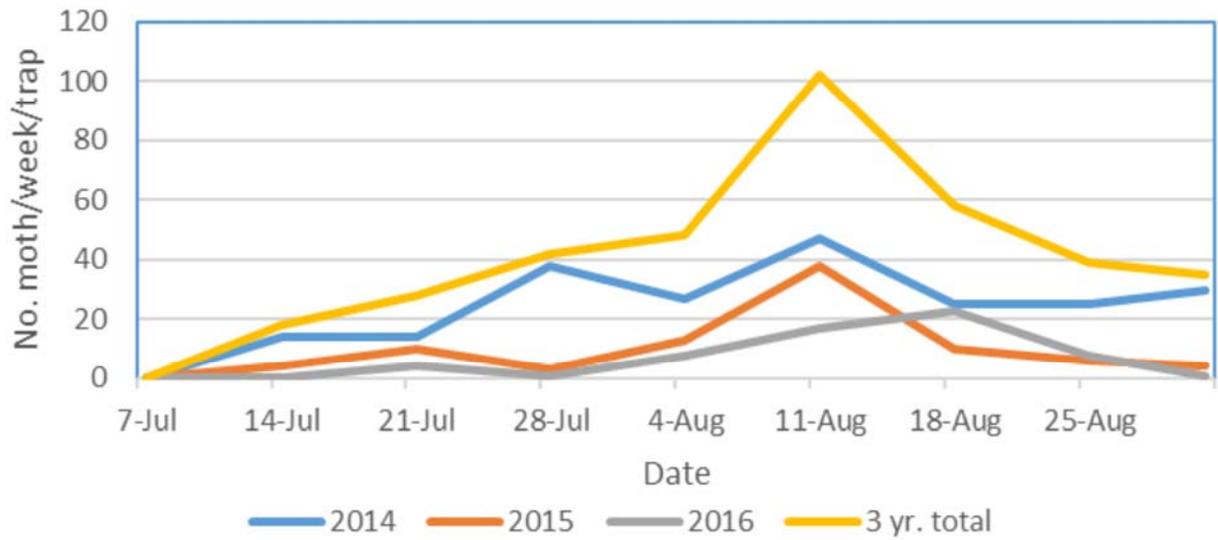


Figure 18. Banded sunflower moth emergence and flight period in Julesburg, CO (2014-2016)

