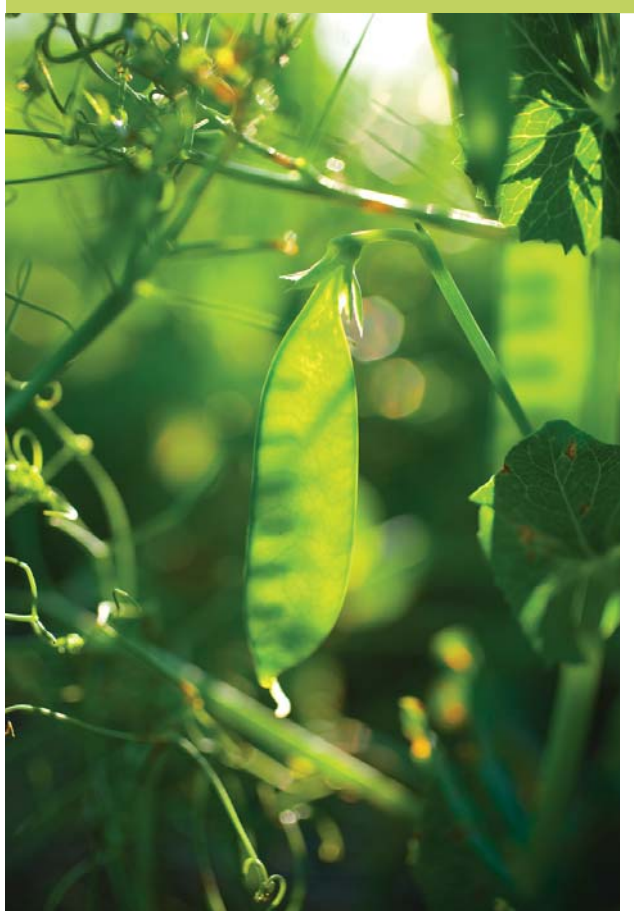
Northern Plains
Student Ag Mag

Pulse Crops



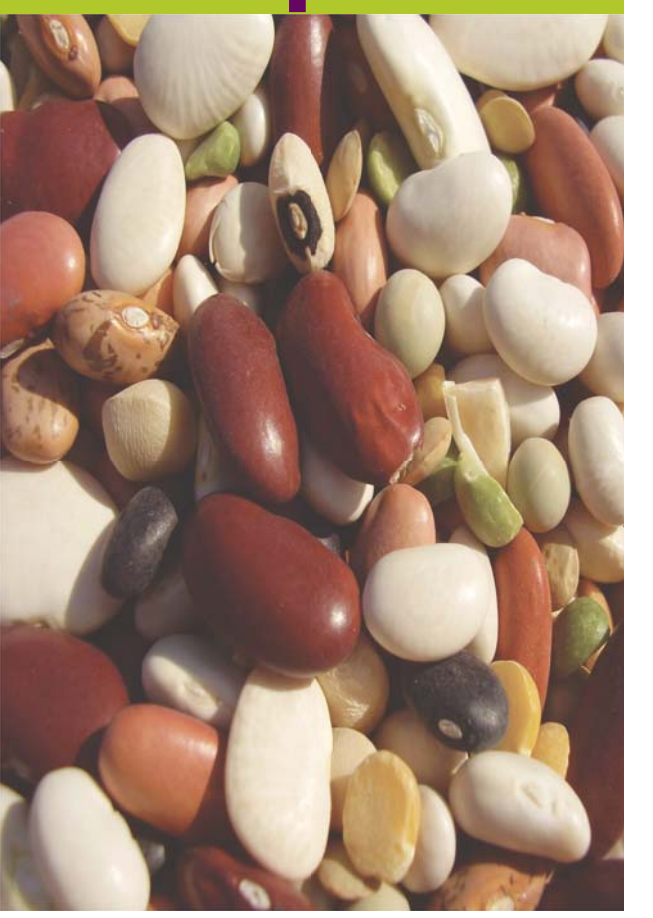
Pulse Varieties

Dry Peas

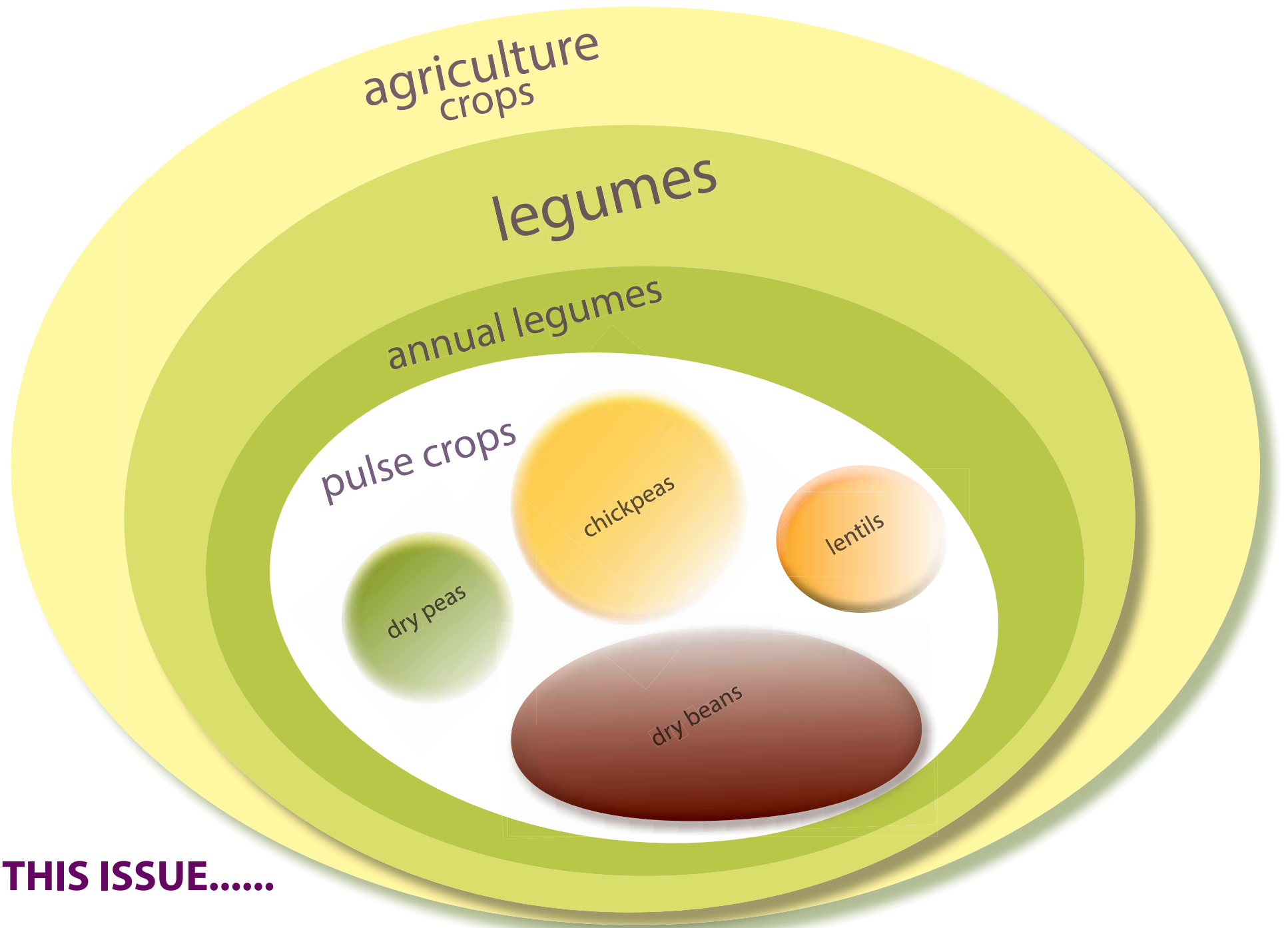
Dry Beans

Lentils

Chickpeas



Northern plains states farmers in Montana and North Dakota and other nearby states raise pulse crops which help to feed the world. Montana and North Dakota alone account for over 80% of all dry pea and lentil production for the entire United States. Pulse crops include dry peas, dry beans, lentils, and chickpeas. Pulse crops are part of a plant family called legumes. Legumes may be either perennial crops like alfalfa and clover or annual crops like pulse crops. It is the dry seeds from pulse crops which are harvested for food; all pulse crop seeds come from pods which are allowed to dry prior to harvesting. The word pulse is derived from the [Middle English] word pols or puls, relating to pottage or thick soup. Split pea soup is one type of soup made with dry peas; easy to see why pulse can mean thick soup! Pulse crops are the main diet in many countries today and have been in the past. There are also other types of dry legumes such as soy beans and peanuts, but these are not considered pulse crops.



IN THIS ISSUE.....

Pulse investigations...

Dry peas consist of different varieties of dry peas which have been grown in farm fields and allowed to dry in their pods. There are two main varieties of dry peas that are used for food: yellow and green peas. Split means that the whole pea has been split in half, which is done so that they cook faster. Dry split peas are used in soups, like split pea soup! Dry peas are often found in stir fry, salads, dips, and casseroles. Dry peas are also ground into flour. In China, dry yellow pea flour is used to make vermicelli noodles.

Lentils consist of different varieties of small lens shaped dried edible seeds, and are one of the pulse crops grown by farmers. Lentils generally grow two to a pod, and are yellow, red-orange, green, brown, cream colored, or black (black beluga©)in color. Source: Dave Oien, Timesless Seeds, Conrad, MT. They are sold whole or split and are used for stews, such as Dal, which is a thick stew served with rice in India and neighboring countries. Many other regions like those in South Asia, West Asia, and the Mediterranean also use lentils as a mainstay in their diets. Many countries use lentil flour for making pasta and baked goods.

Dry Beans raised by farmers consist of different varieties of beans which are related to the green beans we grow in gardens for vegetables. Dry beans are the dried seeds from the pods of bean plants. Dry beans include black beans, pinto beans, kidney beans, white beans, fava beans, mung beans, and many more varieties. They are used in soups, casseroles, dips, and for bean flour. Dried beans can be soaked in water and then cooked, making them a very good value. Beans may also be purchased as canned goods.

Chickpeas grow in pods like other pulse crops. There are two main types of chickpeas: Kabuli and Desi. Kabuli chickpeas, also known as garbanzo beans, are large and white. Kabuli chickpeas are grown in northern plains states as well as Idaho, California, Oregon, and Washington. They are the main ingredient in hummus, and are also used in salads and vegetable dishes. Desi chickpeas are smaller and dark, are used mainly for Dal, and are grown in India. Chickpeas should be eaten cooked. Dry chickpeas can be made into baking flour. Some cultures grind chickpeas up for a coffee substitute after they have been specially prepared.

NUTRITION

Why Pulses are Super Foods

Pulse crops are high in protein, high in fiber, have a low glycemic index, and contain significant amounts of micronutrients that have very favorable nutritional attributes which can address health issues such as heart disease, diabetes, weight control, digestive tract health, some types of cancer, food allergies, and pre-natal health. Pulse crops also contain high amounts of both soluble and insoluble fiber. Soluble dietary fiber can reduce intestinal absorption of fat and cholesterol. Besides the benefits to cardiovascular and digestive tract health, fiber helps prevent large swings in blood sugar levels. A serving of cooked split peas provides 10 grams of dietary fiber compared to the 1 – 3 grams provided by a serving of most commonly consumed grains, fruits, and vegetables. Due to their high protein levels, they are often used in pet foods too.

Nutrients

Pulse crops are good sources of important minerals like iron, magnesium, phosphorous, and manganese. They also contain significant amounts of B vitamins, including folate. Adequate folate intake is important for fetal development because folate is necessary for the formation and development of new and normal tissue.

Folate helps break down an amino acid associated with heart disease, improves metabolism functions, and may reduce asthma and allergy suffering. Lentils and chickpeas boast among the highest concentrations of folate. A single cup of lentils or chickpeas provides over a third of the recommended daily allowance of folate.

Food allergies

Pulses are gluten free which makes them suitable for those that are allergic or sensitive to gluten. One of every 133 people are gluten intolerant in the U.S. Pulse protein concentrates can also be used to replace eggs as a food ingredient in some applications. Eggs are the fourth most common food to trigger allergic reactions in adults in the U.S. Pulse ingredients may also be used to manufacture products targeted at people with lactose intolerance and allergies to soy products.

BUYING AND PREPARING PULSES

Pulses are available in grocery stores in different forms, including canned, prepackaged in dry form, and/or in bulk. You can find chickpeas (garbanzo beans) with other ready-to-use canned beans. Lentils and split/whole dry peas are generally stocked near the rice and dry beans. Pulses should be cooked before eating. Unlike dry beans and chickpeas, lentils and dry peas do not require soaking prior to cooking. Use unsalted water because adding salt to the cooking water may cause the lentils to toughen during cooking. Add acidic ingredients (such as tomatoes) later in the cooking process because they may slow the cooking process. Food safety experts recommend that cooked pulses and cooked dishes containing pulses should spend no more than two hours at room temperature due to their protein and moisture content. Refrigerate leftovers at 40 degrees Fahrenheit or lower and use leftovers within three days. Reheat leftovers to an internal temperature of 165 degrees Fahrenheit prior to consuming.

Dietary Guidelines are depicted on the www.myplate.gov website

On the farm: Nitrogen, irrigation, and legumes

Farmers and gardeners reap benefits from planting legumes as they fix nitrogen from the air onto their roots in small bumps called nodes. In this symbiotic process, rhizobia bacteria invade plant root hairs and multiply in the outer root tissue forming nodes. The tissue acts as a protective enclosure around the bacteria and also supplies energy to the bacteria from photosynthesis. The bacteria convert nitrogen gas to ammonia in the nodules. As nitrogen is fixed onto the roots in these nodes, it helps provide nutrients for the plant itself, and for other nearby plants. After harvesting legumes, the roots leave nitrogen residue in soil for next year's crop.

Farmers benefit by not having to apply nitrogen fertilizer to their crops. Nitrogen is an important element for the formation of soil organic matter and aids plants in growth. Commercial nitrogen fertilizer is made from petroleum, which is non-renewable.

Notable Facts:

1. Each legume species requires a specific species of rhizobia to form nodules and fix nitrogen. Farmers apply the correct rhizobia, known as inoculants, when planting legumes.
2. Pulse crops are grown on both irrigated and non-irrigated lands. Under irrigated conditions, pulse crops take less water than other agriculture crops, 6-12 inches per year compared with 9-15 inches per year for other crops.
3. Legume crops, when introduced in crop rotations, help break disease & pest cycles.

History of pulse crops

Pulse crops are one of the earliest known cultivated crops. They have been found in archaeological digs from areas believed to be over 11,000 years old. It is likely that pulse crops added to mankind's ability to stay stationary, ending the nomadic lifestyle. Pulses high nutritional value as a protein, and a vegetable, met multiple nutritional needs with just one food crop.

"The Greeks and the Romans were cultivating dried peas about 500 to 400 BC, and vendors in the streets of Athens were selling hot pea soup. Scholars believe the peas came either from the area around Switzerland southward into Greece, or from India.

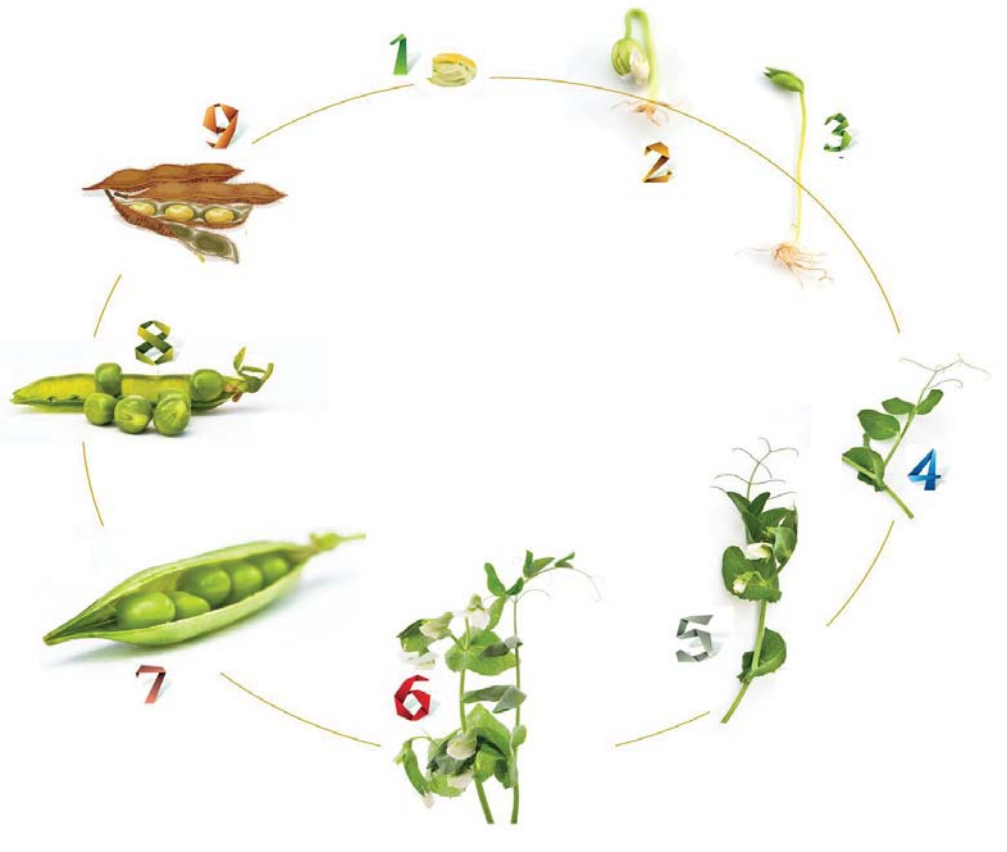
Today the average American eats about 7 and a half pounds of legumes per year. And today there are more than a thousand varieties of green and yellow peas, which are mainly grown in the U.S., Canada, India, China, Russia, Europe, and Australia." Source: http://www.bestcookingpulses.com/history.php

Sampling of pulse varieties

Some pulse crops appear brighter in color because they have been decorticated (had the outer seed coat removed). The Mung Dal and Red Lentils are examples of decorticated pulse crops.

Pulse crop lifecycle

1. viable seed (inoculated)
2. seed germinates and root is visible
3. first leaves (cotyledons) appear
4. first true leaves appear as plant growth continues
5. blooms begin to appear for reproduction
6. new pods are formed following pollination
7. seeds mature in the pods
8. seeds and pods began to dry
9. dried seeds and pods are ready for harvest



SAFETY!

Standing upon stored grains is often an underestimated danger. Anyone can become trapped and suffocate under the shifting surface of stored grains, or grains that are being sucked out of the silo, truck, or pile! Grain dust is also highly explosive!
To prevent injuries from entrapment, never enter a grain storage container, rail car, or silo and do not ride in grain wagons. In addition, if someone is trapped in a silo, never enter to help — instead call an adult or dial 911 or your local emergency number immediately.

CAREERS!

Mackenzie grew up in Walla Walla, Washington where she formed fond ag related memories; the smell of Walla Walla sweet onions in the fields, rows of fresh Klicker strawberries, and fields upon fields of crops being planted to be harvested. Mackenzie's favorite time of year is when the green fields start to turn gold. She originally went to the University of Idaho to throw the javelin for the U.I. track team and to get a B.S. in Food and Nutrition. A weight lifting accident that ended her track career sent her looking for something more meaningful. Soon afterwards she started volunteering for a group called BackYard Harvest (BYH), who donated and gleaned fresh produce to local agencies and food banks. After graduation Mackenzie kept connecting people to food; for six years she was a Nutrition Advisor for the U.I. Extension Eat Smart program. She also continued to serve on the Board of Directors of BYH; getting food out to those who needed it.
Currently as the Food Marketing Manager for the USA Dry Pea and Lentil Council (USADPLC) Mackenzie's role is to build a strong domestic marketing program for pulse crops (dried peas, beans, and lentils). Mackenzie notes, "Representing pulse crops could not be a better fit for me. I did a lot of nutrition education and highlighted these crops when I implemented my programs and cooking classes with the University of Idaho Extension." Mackenzie's work at USADPLC finds her representing growers, processors, exporters/traders, and value-added companies all across the U.S. She notes, "We have six international staff that cover Latin America, North Asia, South Asia, Middle East, Mediterranean, North Africa, Europe and Indo-Pacific Regions. The Council develops and offers resources to operators including webinars, culinary courses, and on-site support and guidance on how to utilize pulses; including culinary concepts to several of the Top 200 food chains based on their needs. If a company is looking to add gluten-free items, we can show them concepts to create healthy and flavorful menu items."
Mackenzie feels like her work allows her to connect people to food on a whole different level. "I want to inspire these folks to develop and serve healthier foods and menu items to the public and to their own families." Pulse crops have the nutrition and functionality to increase nutrition thus making healthier alternatives to many foods and recipes Pulse crops can be used for pulse flour in pizza dough to increase protein and fiber, gluten-free lentil pasta, chickpea flour, horchata (Mexican drink with milk, vanilla, and cinnamon), and pea protein in beverages. Mackenzie notes, "If you have interests in agriculture, food science, or nutrition an agriculture career may be for you, I encourage you to check it out!"

Internet Resources

http://www.northernpulse.com/
http://www.pea-lentil.com/
http://www.ndsu.edu/pubweb/pulse-info/
http://agr.mt.gov/agr/Programs/Commodities/PulseCrops/

Montana Education Standards for this publication can be found by visiting: agr.mt.gov

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From today's kitchen to today's table

Split Pea Salsa

1 cup dry green or yellow split peas, rinsed
2 ½ cups water
1 (19 oz.) can black beans, drained and rinsed
2 cups frozen corn
½ red bell pepper, chopped
¼ cup cilantro, chopped
¼ cup lime juice
2 medium tomatoes, diced
1/2 cup onion, diced
1 tsp. ground cumin
Optional seasonings (cayenne pepper, hot sauce, etc.)

In a medium saucepan, bring peas and water to a boil, reduce heat, cover and simmer until peas are tender (about 20 minutes). Drain and transfer to a large bowl.
Wash and prepare all produce. Combine all ingredients in a large bowl. Serve with tortilla chips.
Makes 10 servings. Per serving: 110 calories, 0.5 g fat,
0.02 g saturated fat, 5 g protein, 20 g carbohydrate,
4 g fiber, 250 mg sodium, 1 mg iron and 23.7 mcg folate.

Packed inside a pulse!

Pulse foods such as dry beans, peas, and lentils are the only food to fit into two categories in the MyPlate nutrition guide: the vegetable and the protein categories! They are packed with protein, vitamins, minerals, and are high in fiber, making them a great choice for your meals.

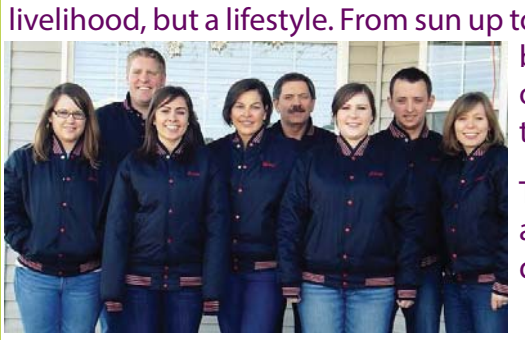
KNOW YOUR FARMER!

"Above all, Zerbe Farms seeks to establish healthy food commodities to help feed the world."

Since its beginning in 1977, Zerbe Farms has sought to provide high quality products and service in the agricultural, farming, and aviation industries. The family owned business has established a company mindset which governs each business interaction. In 1993, Grant Zerbe began to produce high quality crops of lentils, yellow and green dry peas, and chickpeas (garbanzo beans). The implementation of these crops into the overall farming rotation improves soil health. Grant notes that pulse crops can fixate nitrogen from the atmosphere and store the natural nitrogen in the soil, producing nitrogen for the grain crop rotations. This reduces the need for petroleum based fertilizers, thus decreasing CO_2 gases, which inevitably helps the environment and diminishes overall input costs.

In 2002, Zerbe Farms expanded their operations by incorporating into two distinct farming entities: Chickwheat Inc. and Moose Farms Inc. Chickwheat Inc. is owned and operated by Grant and Mary Zerbe. Grant is a third generation farmer, carrying on the legacy established by his grandfather, William, who homesteaded in Valley County, Montana in 1916. Moose Farms, Inc. is owned and operated by their son and daughter-in-law, Clayton and Jennifer Zerbe.

Growing up on a farm gives an insight into food production that is hard to come by elsewhere. Katie Zerbe explains, "I soon came to realize that growing up on the farm was not just a livelihood, but a lifestyle. From sun up to sun down, we would work together as a family for the betterment of the farm. Each family member had their own roles and responsibilities, and would use those for the good of the farm."



Today, Chickwheat Inc. and Moose Farms Inc. continue a family legacy and committment to produce high quality products in an environmentally friendly way.

This publication was made possible by nothern plains pulse crop producers, Northern Pulse Growers Association, and the Montana Agriculture in the Classroom program.

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