CROP and SOIL NEWS/NOTES

July, 2008
Vol. 22, No. 4

DATES AND PLACES

August 19 – Hermiston Agricultural Research and Extension Center Sweet Corn Field Day. Contact person is Phil Hamm (Philip.b.hamm@oregonstate.edu or 541-567-8321).

August 23 – The Second Annual Klamath Basin Research and Extension Center AugustFest. This event will feature booths from all of the KBREC program areas in addition to several field tours of agricultural research trials. For further information, please contact Brian Charlton (phone: 541-883-7131 or 541-883-4590; email: Brian.A.Charlton@oregonstate.edu)

August 26 – Malheur Experiment Station Onion Variety Field Day, 9 a.m. to 1 p.m. For information, please contact Janet Jones (541-889-2174; email – janet.jones@oregonstate.edu

October 2 – Dept. of Agricultural and Resource Economics Conference, "Rising Food and Energy Prices: US Food Policy at a Crossroads," Corvallis. See details on page 7.

October 21-22 – Oregon Society of Weed Science Annual Meeting, Hood River, OR. Please contact Rich Affeldt (541-475-7107; email: Rich.Affeldt@oregonstate.edu) for details.

December 10-12 – Oregon/Idaho Grain Conference, Coeur d'Alene Resort, Coeur d'Alene, ID. Details can be found at www.idahograin.org.

ANNOUNCEMENT

Celebration of the Life of Bob Metzger

A celebration of the life of Bob Metzger will be held on Wednesday, September 24 from 4 to 5 pm at the La Sells Stewart Center on the Oregon State University Campus. Bob was a former USDA-ARS geneticist and smut biologist and life-long triticale breeder. The celebration will be preceded by an informal cookies and punch reception at 3:30 pm at the same location. The celebration will be followed by the annual Crop and Soil Science fall barbeque at Avery Park beginning at 5:30 pm. All of Bob's family, friends and colleagues are invited to attend the celebration and barbeque. Those who are not able to attend but would like to have a brief remembrance message read or displayed at the ceremony are asked to mail their message to Barb Reed at 107 Crop Science, OSU, Corvallis OR 97331-3002 or via email at barbara.j.reed@oregonstate.edu. Those who plan to attend the barbeque are asked to send a note to Barb so that we have an accurate count for food. We look forward to sharing memories of Bob.

WEED CONTROL

Andy Hulting

Poisonous Plants and Weeds in Pastures-Part 2

In the May edition of News and Notes we provided an article on the description of poisonous plants in pastures and rangeland. A partial listing of the types of toxic compounds found in plants, common plant species containing these toxins and symptoms exhibited by livestock after consuming these toxins was given. This month I wanted to provide more detail on the biology and discuss control and management strategies for three of the listed weeds in pastures and range. I picked the following three species to discuss because I have a received a number of calls from across the state related to their management this summer. By the time you read this it will likely be too late this summer to implement some of the control measures suggested here, but remember that the fall can be an excellent time to get a head start on weed management activities for some species or a time to identify areas of pasture or range that will need management the following growing season.

Dalmatian toadflax (*Linaria dalmatica*)

Biology

Dalmatian toadflax is native to the Mediterranean region of Europe and was introduced into North America as a garden ornamental in the late 1800's. It is a tall perennial with an extensive vertical and creeping root system (~ 1' deep and extending ~ 10' in all directions from a single plant) that produces new shoots and plants. It has showy, yellow snapdragon-like flowers from May-September which are insect-pollinated. Toadflaxes survive rapid and extreme temperature changes and grow best on dry, coarse soils with neutral or higher pH. Dalmatian toadflax contains quinazoline alkaloids that are toxic to cattle, but the species is rarely grazed by livestock unless other forage is limited as we discussed in the last article. However, sheep and goats can learn to graze Dalmatian toadflax. Stems are typically branched near the top, leaves are alternate, but can appear whorled near the base of stems. Root fragments can develop into new seedlings limiting efficacy of control by sporadic tillage. This plant reproduces by seed (although seed production is highly variable-1,500-30,000 seeds/plant) and vegetatively. Dalmatian toadflax will hybridize with yellow toadflax (*Linaria vulgaris*).

Management

Overgrazing, soil disturbance and removal of perennial vegetation increase survival of seedlings. Mowing and burning can prevent seed production, but are ineffective for controlling vegetative spread. Intensive cultivation for greater than 2 years can control toadflaxes. The ODA has an active biocontrol program utilizing a defoliating moth and seed head-feeding and stem boring weevils for longer-term control of yellow and Dalmatian toadflax. Chemical control can be achieved with several herbicides but may also take multiple years. Effective broadcast or spot spray treatments include prior to bloom spring applications of dicamba (4-6 lb ae/A) or picloram +2,4-D (0.5 lb ae/A + 1.5 lb ae/A) or a fall application after the first hard frost of imazapic (0.188 lb ai/A). Note that most picloram formulations (Tordon and various other trade names) are restricted use herbicides.

Crop and Soil Science .....Area Code (541)
Administrative Office..... 737-2821
Extension Group..... (Crops Office) FAX 737-1589 (Soils Office).....FAX 737-5725

Dan Curry, Director of Seed Services 737-5094	Dennis Lundeen, Seed Certifications 737-4513
Glenn Fisher, Western Oregon Entomology 737-5502	Jeff McMorran, Potatoes 737-4138
Mike Flowers, Cereals..... 737-9940	Tracy Mitzel, Secretary, Soils Unit 737-5712
Adriel Garay, Seed Laboratory 737-4464	Barb Reed, Secretary, Crops Unit 737-5854
David Hannaway, Forages 737-5863	Silvia Rondon, Irrigated Crops, Entomology 567-6337
John Hart, Soil Fertility..... 737-5714	Dan Sullivan, Soil/Water Quality..... 737-5715
Andy Hulting, Weed Management..... 737-5098	Don Wysocki, Cereals/Soils, CBARC 278-4186
Russ Karow, Department Head..... 737-2821	Bill Young, Seed Production..... 737-5859

Department Web Page..... http://cropandsoil.oregonstate.edu/

OSU Cereals Extension Web Page.....	http://cropandsoil.oregonstate.edu/cereals/
OSU Forage Information System.....	http://forages.oregonstate.edu
OSU Potato Web Page	http://oregonstate.edu/potatoes/
OSU Seed Certification.....	http://www.oscs.oregonstate.edu
OSU Seed Laboratory	http://www.seedlab.oscs.oregonstate.edu
OSU Seed Crops Extension Web Page	http://cropandsoil.oregonstate.edu/seed-ext/
OSU Weeds Web Page.....	http://cropandsoil.oregonstate.edu/weeds/

Poison hemlock (*Conium maculatum*)

Biology

As its name suggests, poison hemlock is a toxic, large biennial weed that was introduced from Europe in the 1800's as a fernlike garden ornamental. It has since become naturalized in many areas of the country. Poison hemlock contains piperidine alkaloids and all parts of the plant are highly toxic to humans and animals including horses, cattle, goats and pigs. However, most animals will avoid eating it when other forage is available. Simply handling plants can cause contact dermatitis in some sensitive individuals. Poison hemlock is characterized by large triangular, dissected compound leaves and purple spotted or streaked stems and a large fleshy taproot. The crushed foliage has a musty odor and since the toxic compounds of poison hemlock are volatile, long-term inhalation of the vapors should be avoided. Poison hemlock reproduces only be seed and produces white flowers from April-July. Most of the plants in western OR are starting to dry down currently. Seed dispersal occurs from late summer through winter and seeds move large distances with water, soil, and through animal and human activities. Seedlings establish rapidly on bare soil of disturbed sites, but seeds do not persist for over 3 years in the soil seedbank so several years of effective, well timed control should limit population expansion as long as new seeds are not dispersing again into a particular site.

Management

Mechanical control of poison hemlock prior to seed production is effective for small populations because plants will not rerow after being hand pulled or when they are cut off below the crown. Cultivation and mowing are also effective on larger populations to limit seed production and population spread. An accidentally introduced European moth, the European paleartic moth, has become widespread in the western US and its larvae will control poison hemlock in some areas although it is not officially listed as a sanctioned biocontrol agent by the ODA. Poison hemlock can be controlled with 2,4-D (1.5 lb ae/A) or MCPA (1.5 lb ae/A) when applications are made to seedlings or rosettes and are most effective soon after plants emerge. Metsulfuron (0.6 oz ai/A) is effective on actively growing plants in the spring. Glyphosate (2-5% solution of a 4 lb ae/gallon product) can also be effectively applied as a spot spray treatment.

St. Johnswort (*Hypericum perforatum*)

Biology

St. Johnswort or Klamathweed is a common long-lived perennial weed of high elevation pastures and roadsides that is characterized by an extensive rhizome root system and bright yellow flowers. This plant can dramatically reduce available forage. The underside of the foliage of this plant is dotted with small, black oil glands that contain hypericin. Hypericin is toxic and causes liver disease and photosensitization in livestock. This same compound is also the active ingredient in St. Johnswort antidepressant medications and has resulted in some varieties of this plant being cultivated as a crop. Mature plants are around 3' tall and have many reddish-brown branches. This species reproduces both vegetatively and by seed. Rhizomes develop near the soil surface and new shoots emerge from the rhizomes during the spring. Seedlings usually do not flower the first year, but as plants mature flowering usually occurs over a long period from June-September depending on elevation. Many populations of St. Johnswort are currently in full bloom in western and southern OR. The flowers are insect pollinated, however they are apomictic (viable seeds will develop without pollination). St. Johnswort thrives in poorly managed, dry range and pasture and seedlings survive best in these disturbed sites. An average of 15,000-30,000 seeds are produced per mature plant and these seeds can be viable in the soil seedbank for around 10 years. St. Johnswort does not grow in wet or saturated soils.

Management

St. Johnswort is particularly susceptible to mechanical control so tillage can therefore be a good management tool when it is feasible to use. Mowing can reduce seed production, but stimulates spread vegetatively through the rhizomes. Defoliating *Chrysolina* beetles can give excellent long-term control of this plant and the ODA has an active program for St. Johnswort management. However, the beetles are sensitive to environmental conditions and will be less effective on some high elevation populations of St. Johnswort. See the ODA bicontrol website for more information on the biocontrol of this species. Burning established populations is not a recommended management tool because it stimulates seed germination and vegetative spread. The synthetic auxin-type herbicides such as 2,4-D ester, aminopyralid and picloram applied pre bloom at labeled rates to St. Johnswort can all be used to suppress and control population established populations. Metsulfuron applied as discussed above and spot treatments of glyphosate are also effective at controlling this plant.

Summary on Poisonous Plant Management in Pastures

Survey pastures-know what toxic weeds are present and understand their biology/ecology

Manage grazing to minimize risk and maximize forage

Manage pastures to minimize weed spread

Control weed populations when necessary

Make an adaptive management plan based on the resources available

Keep the plan flexible-evaluate effectiveness and change methods/timing if necessary

Monitor successes and failures in your plan

Use multiple management techniques to minimize costs and to avoid unintended effects

References

DiTomaso, J. and E. Healy. 2007. Weeds of California and Other Western States. University of California, Agriculture and Natural Resources Publication 3488.

2008 PNW Weed Management Handbook
Online Version: http://ipmnet.org/IPM_Handbooks.htm

ODA Biocontrol Program

http://oregon.gov/ODA/PLANT/WEEDS/biocontrolprogram.shtml

Additional Resources Related To Poisonous Plants

Brown, D. Cornell University Poisonous Plants Informational Database. Cornell University. Updated January, 2008. http://www.ansci.cornell.edu/plants/

Knight, A.P. and R.G. Walter. 2001. A Guide to Plant Poisoning of Animals in North America. Teton NewMedia Publishers, Jackson, WY.

Knight, A.P. Online Guide to Poisonous Plants. Colorado State University. Updated March, 2008. http://www.vth.colostate.edu/poisonous_plants/

SOILS

John Hart and Neil Christensen

Report Cards, Bull's-Eyes, and Nutrients in Wheat Straw — Nutrient Management Considerations as Wheat is Harvested in Western Oregon

Fertilizer prices have risen rapidly in the first six months of 2008. The cost of potassium has more than doubled since 2003, as shown in Figure 1. Growers used to say that fertilizer was "cheap insurance." The statement is no longer true. Fertilizers, especially nitrogen, potassium and phosphorus, are expensive.

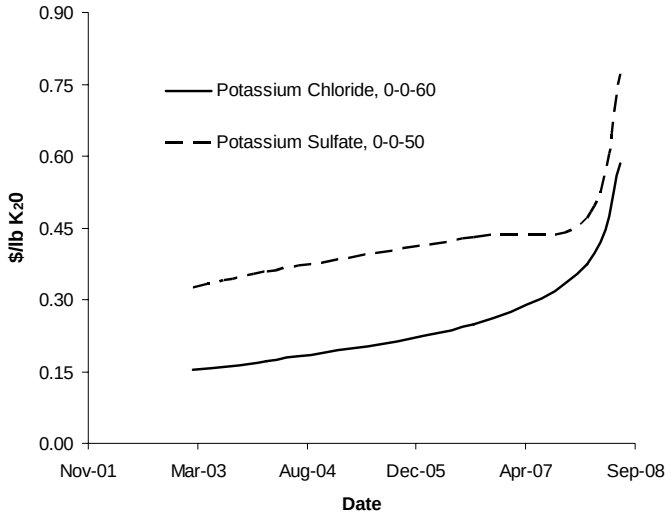

Figure 1. Approximate retail price of bulk potassium fertilizer from March 2003 to July 2008.

The cost of fertilizer makes decisions about nutrients into a year-round task rather than only at the time of application. Even at harvest, growers should consider nutrients and their fertilizer program.

At harvest, wheat growers should consider two nutrient management topics:

- Did I hit a "bull's-eye" with my N rate this year or did I receive an "A" grade on my nutrient management report card?
- How much nitrogen, phosphorus, potassium, and sulfur leave the field in grain and straw?

Did I hit a "bull's-eye" with my N rate this year or did I receive an "A" grade on my nutrient management report card?

The cost of a pound of nitrogen approached $1 in early July of 2008. Applying sufficient spring nitrogen for maximum economic yield (MEY) and not applying more N than needed is extremely important with the current cost of N.

Growers can use the grain protein data they routinely receive when wheat is sold as a "report card" or to check adequacy of spring N fertilizer rate. Maximum economic yield of soft white winter wheat is associated with grain protein concentrations between 8.0 and 10.5% when wheat yield is above 80 bu/a as shown in Figure 2. Grain protein less than 8.5% suggests that N may have been inadequate, whereas grain protein greater than 10.5% suggests that N may have been excessive or yield was limited by a factor other than N.

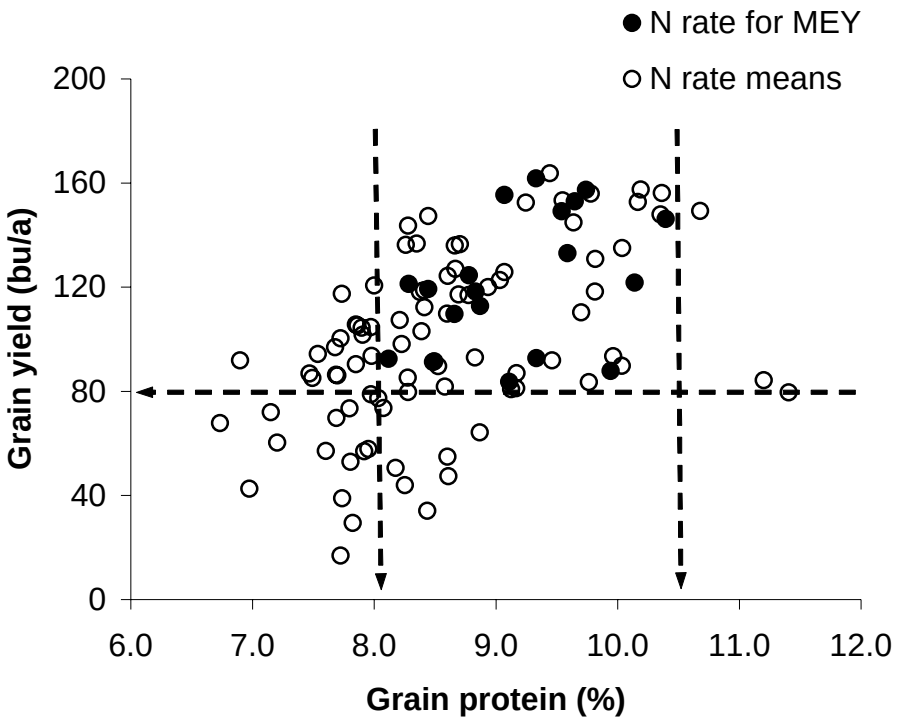

Figure 2. The relationship of soft white winter wheat grain yield and protein concentration from rates of spring N. The horizontal dotted line shows MEY yields were greater than 80 bu/a. The vertical dotted lines show the grain protein for MEY was between 8 and 10.5%. The data are from nineteen N-response studies conducted during 1994-99.

How much nitrogen, phosphorus, potassium, and sulfur leave the field in grain and straw?

A reoccurring question from producers of grain, fruit, or specialty crops is similar, "How many nutrients are in the portion of the crop that leaves the farm?" As wheat producers consider baling straw, the question of nutrient value in wheat straw was asked.

Table 1 provides data for nitrogen, phosphorus, potassium and sulfur concentration for wheat grain and straw. The data are from field experiments performed in grower fields and at Hyslop Research Farm from 1981 through 2003. More than 200 measurements were used for phosphorus, 100 for potassium values, and as few as 15 for the sulfur values.

Grain P, K, and S and straw P values are consistent compared to grain and straw N and straw K. The variability in data from field to field and year to year suggests that you should use these data only for information or comparison to values measured in your fields rather than a basis for fertilizer application rates.

Table 1. Grain protein concentration and nutrient concentrations in soft white winter wheat grain and straw from research in western Oregon.

	Protein	N	P	K	S
	%				
Grain					
Range	7 to 12	1.4 to 2.3	0.25 to 0.4	0.38 to 0.53	0.12
Average	9	1.5	0.33	0.46	0.12
Straw					
Range		0.20 to 0.50	0.02 to 0.14	0.75 to 2.0	
Average		0.25	0.05	1.3	

The amount of N, P, K, and S expected in a 100 bu/a wheat crop is given in Table 2. Most of the crop N is in the grain. In contrast, three-fourths of the K is in the straw. Baling straw removes a substantial amount of K.

Table 2. Nutrient content for a typical soft white winter wheat crop yielding 100 bu/a. Nutrient contents calculated using average concentrations from Table 1 and a Harvest Index of 0.49.

	N	P	K	S
	---------- lb ----------			
Grain (100 bu)	90	20	28	7
Straw (3 ton)	16	3	81	
Crop total	106	23	109	

No assignment of nutrient value is made since fertilizer price is still increasing.

The amount of P is given in the elemental form. If you want to make comparisons for P_2O_5, multiply the values in Table 2 by 2.27. If you wish to compare elemental K data in Table 2 to K_2O, multiply Table 2 values by 1.2.

References

Christensen, N., M. Fery, M. Mellbye, and T. Silberstein. 2003. Validation of Nmin soil test for direct-seed winter wheat. Crop and Soil News and Notes 17(6). Oregon State University Extension Service, Corvallis, OR.

Christensen, N.W. and M.L. Mellbye. 2006. Validation and recalibration of a soil test for mineralizable nitrogen. Communications in Soil Science and Plant Analysis 37:2199-2212.

Jackson, T.L. 1985. Personal communication of unpublished research data.

Kjelgren, R.K. 1985. Fertilizer nitrogen use efficiency by winter wheat in the Willamette Valley. M.S. Thesis, 83 pp. Oregon State University, Corvallis, OR.

SEED CERTIFICATION

Iraj Motazedian

The Value of Certified Seed

In this era of high technology, the words newer and quicker are often equated with being better. However sometimes the restating of a common phrase has more value than something newer. One of those that comes to mind is the old saying “Certification doesn’t cost, it pays”.

In 1996 I had the opportunity to visit Guatemala to help authorities set up a process for Snow pea seed certification. This trip was sponsored by USDA, facilitated by Winrock International, and permitted by the OSU Department of Soil and Crop Sciences and the OSU Extension Education Program.

Guatemala is a major producer of Snow pea, Snap pea and, most recently, French beans for the fresh and frozen markets of the US and Europe. Breaking from traditional agriculture, the small-scale farmers of that country are producing these vegetables. They have gained some prosperity, but they have also become a victim of exploitation by some companies. Less expensive and lower quality, uncertified seed of peas and beans has been provided to these farmers as part of their contracts to produce fresh products for export. This uncertified seed normally is delivered to the grower contaminated with seed burn disease and with up to 40% off type varieties and species. The farmers are forced to cleanup their fields due to the low quality of the seed provided and the export quality restrictions they must meet to ship their end product. This comes at a great loss of time and effort, along with needing to remove up to 40% of their stand to have a clean field. This simply is not sustainable.

In meeting with Guatemalan Export Authorities and representatives of some companies, the problems of sustainability of their current practices were discussed. To improve the situation, it was suggested to shift to certified seed where a third party evaluates the seed quality. As a result of continuous communication, one major company decided to produce Certified seed in Oregon for Guatemala. They brought in seed to have 20 acres of Certified seed peas and beans produced with one grower in the Willamette Valley for the 2008 season. After a recent trip to Oregon to visit the fields, the co-owner of the Guatemalan company visited with me at the Seed Certification office and told me that they are bringing all of their seed production to Oregon. This, because of the expertise of the seed producers here, and the quality and genetic verification offered through Oregon Seed Certification.

Their objective is to produce clean Certified seed for the farmers under their contracts. This would bring in a couple of thousand of acres of peas and beans for seed production in Oregon. It will also give Guatemalan farmers much cleaner seed for planting their crops: a win—win situation that pays for both parties—and that is always better.

SEED LABORATORY

Adriel Garay

Update on the Availability of Germination Chambers at the OSU Seed Laboratory

Oregon, and the Northwest in general, produces a broad range of seeds and the kinds of seeds the lab receives for testing seems to be getting more diverse every year. Some species have different temperature requirements for germination. When the seed industry or researchers/extension staff need to know the germination potential using an official procedure, not having a germination chamber set to the correct temperature can be a serious problem. For these reasons and with the purpose of supporting our research, extension and industry, the lab has just added one more germinator to expand its services and respond to the needs to germinate species with various germination requirements.

At this point, the laboratory has a total of 10 germinators set at the following temperature conditions:

- ***Constant temperature***: 5°C, 10°C, 15°C, 20°C and one that can be set at any other temperature depending on the needs.
- ***Alternating temperature***: 15-25°C, 20-30°C, and 25-35°C.

To organize and facilitate the use of the germinators by various parties, we are asking that the following conditions be considered:

- These chambers are used intensively for official testing purposes during the grass testing season (summer and fall), but typically space is available from January to June.
- The official tests are conducted by only the OSU lab staff following official rules, charging a full rate for each test. Typically, customers from the seed industry use this service.
- For the OSU researchers/extension projects, the lab can conduct various tests for discounted fees.
- If a project has no fund, researchers can come to the lab and do the tests themselves. Some people bring their own germination paper, dishes, etc. The best time for this option is during the low testing season (January-June).
- For any one who is interested in doing germination studies but not familiar with it, feel free to come by and we can help you design and implement the study.

Thank you for your cooperation and we are looking forward to helping you in your germination testing needs.

For any question, please call Adriel Garay at the OSU Seedlab (541) 737-4464 or Email Adriel.Garay@oscs.orst.edu

FOR YOUR INFORMATION

Rising Food and Energy Prices: US Food Policy at a Crossroads

The OSU Department of Agricultural and Resource Economics has organized a conference around the issue of food and energy prices and supplies. The conference, titled “Rising Food and Energy Prices: US Food Policy at a Crossroads,” will be held on Thursday, October 2ns at the CH2M Hill Alumni Center on the campus of Oregon State University. The following link provides more details and registration information http://oregonstate.edu/conferences/foodenergy/. Most of the conference costs will be covered by the Chambers-Eisgruber fund.

The focus of the conference is on biofuels and their impact on both food and energy markets nationally and across the world. This conference is aimed at a nonacademic audience, specifically policymakers in government at all levels, the media, farmers, processors and others in the agribusiness economy, environmental groups, and the general public. Registration is $20 for the day (including a buffet lunch) and $45 for the day, reception and dinner. A number of agricultural economists from across the country are speaking at the conference and Oregon Senator Smith has been invited to give the keynote dinner speech. We expect to have several hundred people in attendance.

Extension Crop and Soil Science
Oregon State University
107 Crop Science Building
Corvallis, OR 97331-3002

Non-Profit Org.
U.S. Postage
PAID
Corvallis, OR
Permit No. 200

Crop and Soil News/Notes is published by the Extension Unit of the Department of Crop and Soil Science, Oregon State University. The newsletter is published six times yearly during the months of January, March, May, July, September and November.