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The Buttercups of Indiana

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The Short Story.

There are several buttercups found in Indiana. The buttercups are toxic plants and can cause poisonings in grazing animals; however, they are reported not to be toxic in hay. In almost all or at least in the most frequently encountered buttercups the flowers are yellow. These plants can be problematic in no-till crops, gardens, pastures, wheat, and waste areas. Fall or early spring applications of glyphosate + 2,4-D, Autumn [corn only], Princep [corn only] and Canopy XL + 2,4-D [soybean only] have provided excellent (90 to 100% control) control of smallflower buttercup. In grass pastures, Cimmaron, 2,4-D, and crossbow will provide good to excellent control of most buttercups. Dicamba's control of buttercups may be a little more inconsistent ranging from fair to excellent. In winter wheat, Osprey, Olympus, Peak, and Harmony Extra have been reported to provide excellent control of smallflower buttercup. Always read and follow pesticide labels when using pesticides.

The Longer Story.

Introduction:

The word 'buttercup' is a common name that is associated with a fairly large group of plants. Although, they are predominantly in the genus Ranunculus spp. there are other important genera in this family, but we will leave that for another day and this article will focus on the genus Ranunculus spp. To complicate matters, the genus Ranunculus spp. also includes similar plants called the 'spearworts' and so the common name game goes on. In Indiana, there are approximately 20 species in this group of plants called the buttercups (Table 1). Others can only be found in the Western US and

Table 1. List of buttercups in Indiana

Buttercup	Ranunculus
littleleaf	*R. abortivus*
tall	*R. acris*
bulbous	*R. bulbosus*
alkali	*R. cymbalaria*
early	*R. fascicularis*
fig	*R. ficaria*
yellow water	*R. flabellaris*
Gmelin's	*R. gmelinii*
Harvey's	*R. harveyi*
bristly	*R. hispidus*
Lapland	*R. lapponicus*
Mississippi	*R. laxicaulis*
longbeak	*R. longirostris*
rock	*R. micranthus*
smallflower	*R. parviflorus*
Pennsylvania	*R. pensylvanicusnicus*
creeping or corn buttercup	*R. repens*
Labrador	*R. rhomboideus*
hairy	*R. sardous*
cursed	*R. sceleratus*

Information compiled from the USDA Plant Data Base [http://plants.USDA.gov]

Pasture infested with buttercup. Photo source A. Held

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Canada, yet others can be found only in the Southern US. Plants in the buttercup family (Ranunculaceae), also called the crowfoot family have a few characteristics that are typical to the family.

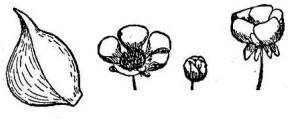
Buttercups, although considered attractive to some, can often be found in no-till row crops, wheat fields, pastures, and neglected areas. Dense populations of small flower buttercup have been observed in no-till studies in Southeast Indiana.

Identification:

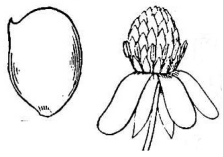
Typically when thinking of buttercups many think single yellow flowers with five petals. In some cases that would be correct, but buttercup flowers can have a variable number of petals within the same species and some flowers are white or pink. However, in Indiana they are most often bright to light yellow. In some species the petals are waxy in appearance. One characteristic of the flowers that is consistent, but you have to take a good look, is that there are many reproductive structures within a flower. The many female components of the flower are born on a cone like structure in the center and the many male components surround the cone.

These cones in the middle of the flower will eventually become the fruit of the plant. When looking at the fruit of the Ranunculus I often think of a raspberry. The seeds are an achene that always has a notch or described as a beak in Britton and Brown's "An Illustrated Flora of The Northern United States." This 'beak' is often an identifying character of the species in question; it can be an indiscreet bump to a curled hook.

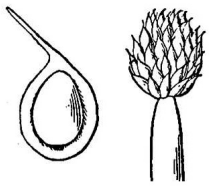
The leaves are variable even within a specific species[1]. They range from entire to many types of lobbing. Some are finely divided and others, as in the case of the basal leaves, can be rounded or kidney shaped. For simplicity sake, we will give identifying characteristics of only five buttercups; the buttercups that we may often encounter in agriculture.



Tall buttercup



Littleleaf buttercup



Yellow water buttercup

Britton, N.L., and A. Brown. 1913. An illustrated flora of the northern United States, Canada and the British Possessions. Vol. 2.

Buttercup. Photo source A. Held

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Smallflower buttercup [*R. parviflorus*][2]

This is an annual and can reach a mature height of 6 to 10 inches. Stem and petioles can be hairy. Basal leaves have long petioles and round leaves which are more or less 3-cleft and approximately 1 inch in diameter. The upper stem leaves are either short petioled or sessile (attached to the stem with out a petiole) and lobed into 3 to 5 linear to oblong lobes. Flowers are yellow and tiny, 0.06 to 0.2 inches wide. Close inspection of the flower will show small oblong petals a little longer than the calyx (the whorl of sepals below the flower, the 'flowers cup'). The fruit is round and approximately 0.17 inches wide. The seed is an achene that is flat and has a sharp beak about 0.25% of its length. The surface of the achene has tiny bumps, but this will require a magnifying glass to see. Generally blooms in the summer months.

Tall buttercup [*R. acris*][2]

This buttercup is a perennial and can reach a height of 2 to 3 feet tall. This buttercup is also hairy. The upper portion of the stems can branch. The basal leaves are tufted and divided 3 to 7 lobes and the margins of the lobes can be further indented. The upper leaves have short petioles and are divided 3 times. Flowers are bright yellow with a waxy appearance and about 1 inch wide. The petals are 2 to 3 times longer than the calyx and round. The fruit is bulbous and 0.5 to 0.6 inches wide. The achene has a short sharp beak.

Harvey's buttercup [*R. harveyi*][2]

This buttercup is also a perennial. It is branched and can reach a height of 8 to 18 inches tall. Harvey's buttercup does not have any hair; it is 'glaborous'. It tends to branch as you move up the stems. The basal leaves are on long petiols and round or slightly kidney shaped. They have rounded ridges on the margins (crenate) or can be slightly lobed and are 0.4 to 1.5 inches wide. Like smallflower buttercup, the upper leaves are sessile or have small petioles and are deeply cleft about 3 times. Flowers are bright yellow, with 4 to 8 petals and are 0.5 to 0.75 inches wide. In this case, the petals are 4 to 5 times longer than the calyx. The fruit is 0.17 inches in diameter and the achene is tipped with a small straight beak.

Littleleaf buttercup [*R. abortivus*][3, 4]

Annual or biennial, this buttercup is slightly hairy, branches from the base of the plant, and is 6 to 20 inches tall. Basal leaves are round with margins similar to Harvey's buttercup and are on long petioles. Upper leaves have short petioles and are divided into 3 to 4 leaflets. The flowers are yellow and have 5 small oblong petals. Petals are close to the same size as the sepals. Achenes have a small hooked beak. Generally blooms March to June.

Creeping buttercup or corn buttercup [*R. repens*][2, 5]

This buttercup can be distinguished at first glance by having stolons that root at the nodes. This perennial can spread forming colonies. This plant can be hairy to sparsely hairy. Basal leaves and upper leaves have 3 leaflets. In the upper leaves two leaflets are sessile while the center is extended on the petiole. Flowers are bright and shinny having a waxy appearance and are approximately 1 inch wide. Petals are round and are longer than the sepals. Fruit are 0.3 inches wide and the achene has a short thick and slightly bent beak.

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Toxicity:

Buttercups are problematic in pastures. The buttercup family includes several toxic plants. This family also contains the larkspur and staggerweed (Delphinium spp.). The whole plants are toxic to all live stock. Cursed crowfoot (R. sceleratus) is reported to be one of the most toxic[6]. The toxic component is an acrid volatile substance called anemoral and an irritant called protoanemonin, reported to be a plant produced anibiotic[6, 7]. All buttercups have various amounts of this or related compounds. Symptoms of poisoning are drooling, diarrhea, increased heart rate, behavior changes such as weakness and depression, bleeding, and convulsions[6, 8]. Protoanemonin has been reported to cause irritation to the skin in humans. Amounts of plant tissue required to be dangerous depends on species of plant but in the article "Poisonous Pasture Plants and Livestock" by Dwight Lingenfelter and Bill Curran of Pennsylvania State University, reported approximately 1 to 3% of body weight could cause poisoning[9]. Toxicity does not appear to carry through in the hay, possibly due to the rapid break down of the toxins involved[6].

Control:

There may be differences between specific species and efficacy work done on one species may not mean that same treatment will be successful on all species. Much of the work in the mid-west has been done on smallflower buttercup. Products that are reported to be effective on smallflower buttercup may not be as affective on all buttercups for example tall buttercup which is a perennial[10, 11].

In studies done at Purdue University10, smallflower buttercup was controlled above 95% and higher with 2,4-D [1 pt/A], glyphosare [0.5 to 0.75 lb ae/A], Autumn [0.3 oz/A and up], Canopy XL plus 2,4-D, and fall applications of 2,4-D [1 pt/A]. Glyphosate plus 2,4-D can be used as a fall or early spring burndown in corn or soybean. If 1 pt/A of 2,4-D is used before soybean a one week planting restriction will need to be observed. Canopy XL plus 2,4-D can also be used as a fall or early spring burndown. The Canopy component will provide some residual activity. Autumn is labeled for applications before corn. There are reports of triazines alone not be highly effective on buttercups[10, 13].

In winter wheat, Osprey, Olympus, Peak, and Harmony Extra provided excellent control of smallflower buttercup[10, 12]. Osprey and Olympus can be applied in the fall or early spring before jointing. Peak can be applied in the fall or spring before the second node is visible (Feek's Growth Stage 7) and Harmony Extra can be applied in the fall or spring after the 2-leaf stage and before jointing.

Buttercups in grass pastures can be an increased concern due to the toxicity posed to grazing animals. The products Cimmeron, Cimmeron Max, and Crossbow have excellent (> 90% control) of most buttercups you will encounter. Other products that have good control of buttercups are 2,4-D, Curtail, Milestone, and Forefront. Dicamba may provide fair to good control but appears to be a little more inconsistent than 2,4-D.

For free herbicide labels go to

www.cdms.net
or
www. greenbook.net

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Reference:

1. Menadue, Y. and R. K. Crowden. 1989. Leaf Polymorphism in Ranunculus nanus Hook. (Ranunculaceae). New Phytologist, Vol. 114, No. 2, pp. 265-274

2. Britton, N. and A. Brown. 1913. An Illustrated Flora of the Northern United States and Canada. Vol. II. Dover Publications Inc., New York. pp. 104-115.

3. Wax, L.M., R.S. Fawcett, L.J. Moshier, W.F. Meggit, D.L. Wyse, L.C. Haderlie, C.G. Messersmith, L.B. Bendixen, W.E. Arnold, J. Doll, M.K. McCarty, K.P. Dorschner, and H.R. Lund. 1981. Weeds of the North Central States. University of Illinois. pp. 82-83.

4. Anonymous. Missouri Plants. com; Ranunculus abortivus. Accessed May 29, 2008. http://www.missouriplants.com/Yellowalt/Ranunculus_abortivus_page.html

5. Uva, R.H., J.C. Neal, and J.M. DiTomaso. 1997 Weeds of the Northeast. Comstock Publishing Associates, Cornell University Press.

6. McCain, J.W., R.J. Goetz, and T.N. Jordan. 1985. Indiana Plants Poisonous to Livestock and Pets. Cooperative Extension Service, Purdue University. pp. 42, 63.

7. Blasco, R., M. Mallavarapu, R. Wittich, K.N. Timmis, and D.H. Pieper. 1997. Evidence that formation of protoanemonin from metabolites of 4-chlorobiphenyl degradation negatively affects the survival of 4-chlorobiphenyl-cometabolizing microorganisms. Applied and Environmental Microbiology. Vol. 63 (2).

8. Majak, W. 2001. Review of Toxic Glycosides in Rangeland and Pasture Forages. Journal of Range Management, Vol. 54, No. 4

9. Lingenfelter, D. and B. Curran. Accessed on May 29, 2008. 2007. Poisonous Pasture Plants and Livestock. Field Crop News, Pennsylvania State University. [http://fcn.agronomy.psu.edu/2007/fcn0717.cfm]

10. Johnson, B. Accessed on May 29, 2008. Purdue Integrated Weed Management Annual Research Report. 2007-2002. [http://www.btny.purdue.edu/weedscience/resreport/BJ2005/default.htm]

11. Annonymous. Accessed on May 29, 2008. Tall buttercup (Ranunculus acris L.) control in 1999 following fall herbicide application in 1998 Woodland, MN – Kanabee Co. [http://appliedweeds.coafes.umn.edu/reports/1999/99pdfs/misc/99mis04.pdf]

12. Krausz, R.F. and B.G. Young. 2007. Brass and broadleaf weed management in winter wheat. NCWSS PROC. Vol. 62:92.

13. Annonymous. Pest Facts Sheet: Ranunculus repens L. North American Plant Protection Organization.