

# Creeping Buttercup: A Pleasing Perennial?

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## EXECUTIVE SUMMARY

It is with great pleasure to describe a new ground cover perennial that will blanket an area with lush, low growing foliage. If you are searching for a hassle-free plant that will greet you each year with its hardy growth, look no further. The trailing stolons on Creeping Buttercup will waste no time in turning a once barren, plant-free area into a lush carpet of emerald green foliage. Once the plant has some time to establish, you will be greeted with the most luminous yellow flowers you have ever set your eyes on. The allure of these simple yet captivating flowers will make you want to lay in a hammock and enjoy a warm spring day. When held under the chin, the flowers will give off a shimmering yellow reflection that will remind you of the children in an old Norman Rockwell painting. Propagation of Creeping Buttercup couldn't be easier, with seeds germinating around seven to fourteen days, and it can even be propagated from the runners it produces. You won't have to worry about height control or using plant growth regulators with this plant, because as long as it has the adequate space, it will reward you with endless growth from year to year. One important thing to consider before growing Creeping Buttercup is that it will not be a good choice if you have fields with grazing cattle. The *protoanemonin* chemical inside the plant may cause some irritation to cattle and livestock, but this also means it may serve as a beneficial deer deterrent. Creeping Buttercup will make an excellent addition for anyone who is looking to implement a gorgeous spreading groundcover crop into their wide-open landscape.

## INTRODUCTION

### A. Study Species

The species that will be discussed in this paper is the low growing perennial plant, *Ranunculus repens*, commonly referred to as Creeping Buttercup (Figure 1).

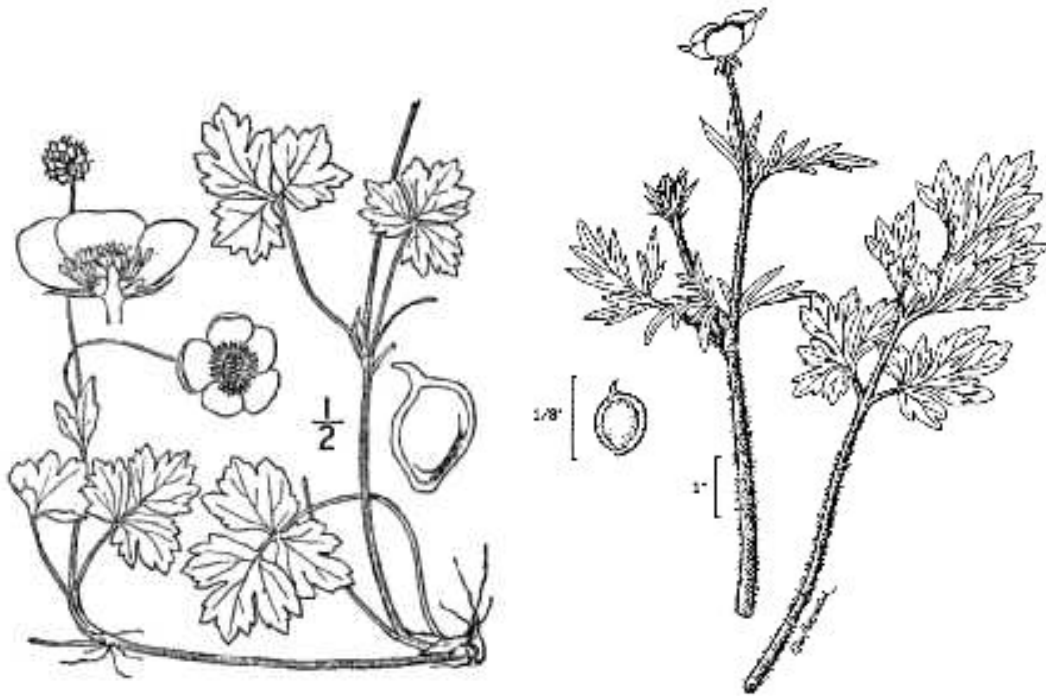


Figure 1: Illustration of Creeping Buttercup (USDA.gov, 2019).

### B. Taxonomic Classification and Geographic Distribution in the Wild

Table 1. Taxonomic classification of *Ranunculus repens*. (USDA.gov, 2019).

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<b>Kingdom:</b> Plantae (Plants)	<b>Subclass:</b> Magnoliidae
<b>Subkingdom:</b> Tracheobionta (Vascular plants)	<b>Order:</b> Ranunculales
<b>Superdivision:</b> Spermatophyta (Seed plants)	<b>Family:</b> Ranunculaceae (Buttercup family)
<b>Division:</b> Magnoliophyta (Flowering plants)	<b>Genus:</b> <i>Ranunculus L.</i> (buttercup)
<b>Class:</b> Magnoliopsida (Dicotyledons)	<b>Species:</b> <i>Ranunculus repens L.</i> (creeping buttercup)

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## **Taxonomic Description**

The plant *Ranunculus repens* is a part of the *Ranunculaceae*, also known as the Buttercup family Table 1 (USDA.gov, 2019). This plant species belongs to the genus *Ranunculus* L. (buttercup), in which there are around 93 different species (USDA.gov, 2019). The emergent characteristics of this plant are low growing with crawling stolons that can quickly cover an area like natural wetlands or pastures (kingcountry.gov, 2019). This perennial plant will grow up to 91 cm long and the dimensions of the basal leaves are around 1 ¼ to 9 cm long and up to 10 cm wide (Klein H., 2011). The leaves may look somewhat egg-shaped, alternately formed, toothed, triangular, trifoliate, and the stems and leaves will be somewhat hairy (Klein H., 2011). *Ranunculus repens* may be easy to identify from other species based on the horizontal growth, spherical seed heads, and crawling stolons (Klein H., 2011). Bloom time is mid-spring



Figure 2: Creeping Buttercup with trailing stolons (kingcountry.gov, 2019).

and can withstand a minimum temperature of -33° Celsius (USDA.gov, 2019).



Figure 3: Picture of the sample species from Alaska, with interesting markings on the large leaves.

The basal leaves will have somewhat pale patches on the tops, similar to certain *Geranium* species, and long petioles (kingcountry.gov, 2019). As one glances upward toward the top of the plant it is evident that the leaves making up the uppermost portion of the plant will have shorter or sometimes no petiole (kingcountry.gov, 2019). These plants can grow to a maximum height of 12 cm tall with five (sometimes more), small, radiant yellow petals measuring 6-10 mm (kingcountry.gov, 2019).



Figure 4: Bright yellow flower of Creeping Buttercup (kingcountry.gov, 2019).

### **Tendency to naturalize or become invasive**

*Ranunculus repens* is known for being very aggressive and has the capability to take over and crowd other plants growing nearby (kingcountry.gov, 2019). In one year, a single plant may take over as much as 40 square feet (kingcountry.gov, 2019). Some explanations for why *Ranunculus repens* can cause such competitive issues is due its ability to deplete potassium from the soil, causing nearby plants to grow poorly, and its stolons being able to respond to changing environmental conditions (kingcountry.gov, 2019). When environmental conditions are satisfactory, the stolons will form by divaricating, but when one or more nutrients is restricted, the stolons will be lengthier and unbranched to allow the stolons to select more sites until a favorable location is found (kingcountry.gov, 2019). When a site is found to be satisfactory, the stolons will continue to divaricate to make the most of the nutrient rich area (kingcountry.gov, 2019). The primary means of reproduction for Creeping buttercup is vegetatively from stolons and rhizomes, but it will also reproduce sexually by seed (Klein, H., 2011).

### **Legal Listings**

- Has not been declared noxious
- Listed noxious in Alaska
- Listed noxious by other states (prohibited in Massachusetts)
- Federal noxious weed
- Listed noxious in Canada or other countries (QC)

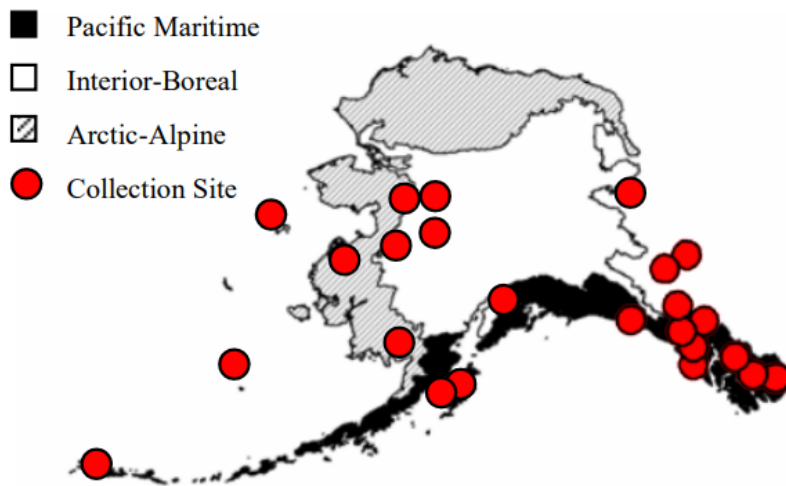
Figure 5: Legal Listing of *Ranunculus repens* (University of Alaska Anchorage, 2011).

### **Plant Toxins**

The toxin in fresh buttercup, known as *protoanemonin*, has proven to be detrimental to grazing animals and will cause problems such as skin irritation, blisters, inflammation, salivation, and can be fatal if consumed in larger quantities (kingcountry.gov, 2019). The poisonous substance *protoanemonin* is discharged in the sap of both the creeping and tall varieties of buttercup (Klein H., 2011). When dry, creeping buttercup loses much of its potency due to the toxin being unstable (kingcountry.gov, 2019).

### **Geographic Distribution**

Creeping buttercup typically grows in pasturelands, meadows, woodlands, and near wet areas like swamps, lagoons, and streams (Klein H., 2011). According to an article from the Alaska Natural Heritage Program, “Creeping buttercup is native to Europe, where its range extends northward to 72° N in Norway. It has naturalized in many temperate regions around the world, including North America, South America, Asia, Africa, Australia, and New Zealand. In Alaska this species has been documented from all three ecogeographic regions” (Klein, 2011).



Distribution of creeping buttercup in Alaska.

Figure 6: Locations of *Ranunculus repens* throughout Alaska (University of Alaska Anchorage 2011).

creeping buttercup (*Ranunculus repens*) [Share](#) [Download](#) [Flag](#) [Fullscreen](#)

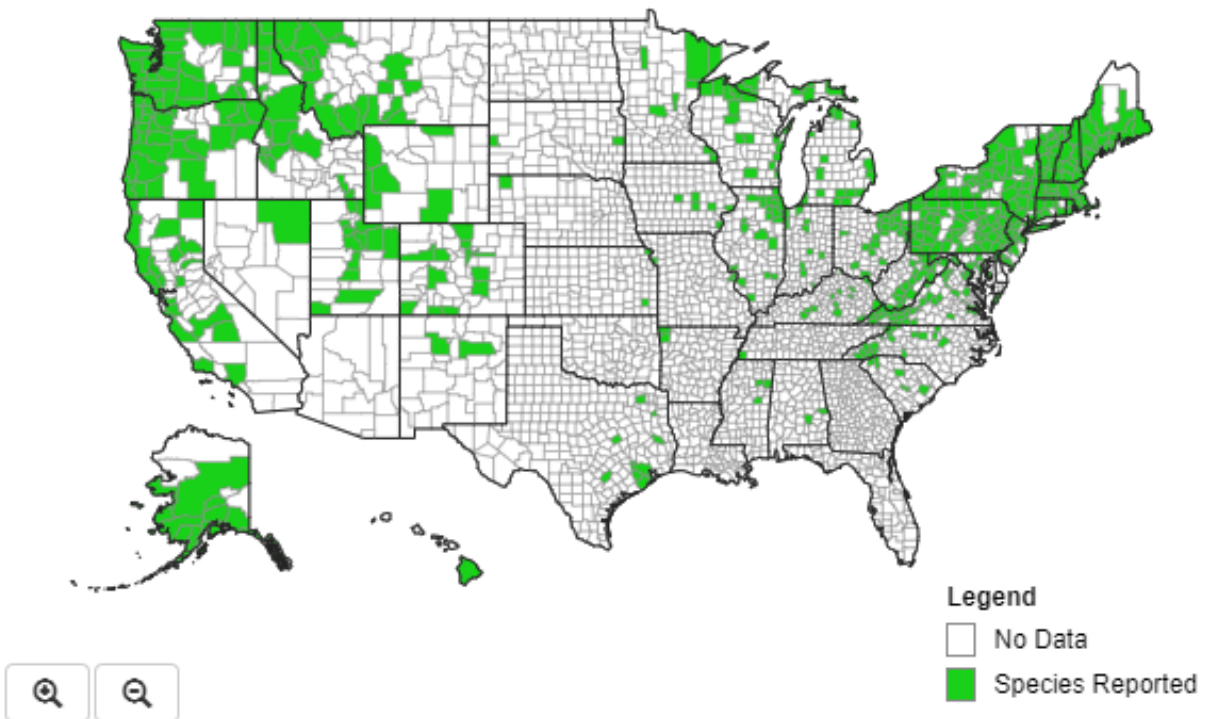


Figure 7: Location of *Ranunculus repens* throughout the U.S. (USDA plant database 2018).

### **Is this an edible crop?**

Due to *Ranunculus repens* sap being toxic, it would appear that the raw form is not edible and may be poisonous to humans. There is some evidence of the plant being used as medicine, which is discussed below.

### **Does this crop have any particular attributes useful for medicinal or other purposes?**

There was research conducted in the early 1980s that discusses the effectiveness of the Ranunculaceae species as medicine. One report stated that the medicinal use is for counter-irritation and minimizing inflammation in the tissues (Turner, N. J. (1984). It was commonly used by the Nootka tribe of British Columbia as a poultice for wounds, welts, muscular pains, and tautness/swelling (Turner, N. J. (1984). The dazzling yellow color of the petals of *Ranunculus repens* is frequently known for the children's game where a child holds the flower under the chin of another, the flower will give off a reflection onto the chin that is said to mean that the person has special feelings for the other, or that person likes butter (Vignolini, S., et al., 2012). Scientific research has been concentrated on the role of the optical appearance of this flower type in plant pollinator synergies (Vignolini, S., et al., 2012). Due to the directional scattering of light given off by the glossy flower, this may prove to be an effective plant for insect signaling and pollination (Vignolini, S., et al., 2012).



Figure 8: (a) Picture of *R. repens* flower. (b) Chin illumination by the flower in ambient sunlight (Vignolini, S., et al., 2012).

## CROP SPECIES

### A. History and Potential Uses:

Table 2: Current cultivars of commercially available <i>Ranunculus repens</i> on the market.			
Nurseries	Cultivar	Quantity/Propagation	Price
Heritage Flower Farm	<i>Ranunculus repens</i> <i>var. pleniflorus</i>	3-9 (bareroot)	\$8.95/bareroot
British Wild Flower (on Amazon)	<i>Ranunculus repens</i>	400 (seed)	\$5.99/package of seed
Swift Greenhouses Inc.	<i>Ranunculus repens</i> Buttered Popcorn	-275 plug tray (broker only) -50 plug tray (broker only)	Call for price/wholesale only
Blooming Nursery	<i>Ranunculus repens</i> Flore Pleno	Currently not in production	Currently not in production

Bluebird Nursery	<i>Ranunculus repens</i> Creeping Buttercup and Buttered Popcorn cultivars	Call for information/wholesale only	Call for price/wholesaler only
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There were a few companies that sold the *Ranunculus repens* species, or some cultivar similar to it, but it seems as if the main use for the crop is as a natural ground cover. There does not seem to be any breeding work currently being done on this plant. Due to its very invasive tendencies it may do best as a field ground cover, pollinator for bees/insects, container crop, groundcover in garden, and possible deer deterrent. From the research being gathered it does not seem like this would be a good plant to implement into the garden amongst other perennials or native plants, as it may deter growth and outcompete. However, it would be perfect groundcover in containers. It is also on the noxious weeds list in the U.S. and Canada and even prohibited in Massachusetts, so marketing this plant to consumers may prove to be cumbersome. The companies or firms that could possibly sell this plant would be one that specializes in selling ground cover plants or specialty meadow crops for a larger area of land. Creeping buttercup would most likely be sold as seed, but bareroot/stolons may be sold as well.

**PRODUCTION INFORMATION**

**A. Anticipated Cultural Requirements**

**Life Cycle**

*Ranunculus repens* is a perennial plant and, depending on the environmental conditions, will die to the ground level or will overwinter as a rosette (kingcountry.gov, 2019). Growth will

take place between April and June and will be very accelerated (kingcountry.gov, 2019). The small yellow flowers will make their presence from March-August (kingcountry.gov, 2019). Seeds will be produced shortly after flowering ends and each plant will yield anywhere from 20-150 seeds (kingcountry.gov, 2019). When attempting to market this for sale it may be effective to sell the plant as a hardy, fast-growing perennial groundcover.

### **Plant Characteristics**

Some traits that would make this plant effective for market would be its fast growing and hardiness potential. The ability to spread and cover large areas in a short amount of time may prove beneficial for customers who want a ground cover species that is hassle free. If the issue of spreading is too much for certain customers, it may make a nice container plant.

### **Winter Hardiness & Heat/Drought Tolerance**

*Ranunculus repens* will be hardy in Zones 3-8, with a heat zone of 1-8 (USDA.gov, 2019). According to the USDA map there are only seven states where this plant has not been introduced so it could be positioned in nearly all over the U.S. except for very dry, arid areas.

### **Potential Production Environment**

**Light:** 500-1,500 f.c. (5.4-17 k lux) for stage 2 plants, 1,500-2,500 f.c. (17-27 k lux) for stage 3 plants, 2,000-3,000 f.c. (22-32 k lux) for stage 4 plants (Nau, 2011). When growing on provide light levels up to 5,000 f.c. (54 k lux) (Nau, 2011). When flowering begins, reduce light levels to 2,000-2,500 f.c. (22-27 k lux) (Nau, 2011).

**Temperatures:** For seedlings, maintain soil temperatures of 50-55°F/10-13°C (Nau, 2011).

Raise temperatures to 55-60°F/13-15°C for stage 3 plants (Nau, 2011). For fastest

flowering it is best to grow at the higher end range of 55-60°F/13-15°C days and 40-50°F/4-10°C nights (Nau, 2011). Temperatures that fall below 50°F/10°C will encourage branching, while temperatures above 65°F/18°C will encourage stretching, premature flowering, or even dormancy (Nau, 2011).

**Soil:** For best results use a well drained, disease free germination medium in 288 or 128 plug tray, covered lightly with coarse vermiculite (Nau, J. 2011). Use the same type of media for seeds and transplants. A 288-plug tray will take 8-10 weeks from sowing to be ready to transplant (Nau, 2011).

**Fertilizer/Growth Regulators:** Fertilize weekly with 50-57 ppm feed with 14-4-14 for stage 2 plants (Nau, 2011). Increase feed to 100-150 ppm from 14-0-14 for stage 3 plants (Nau, 2011). Continue with a 14-4-14 for stage 4 plants (Nau, 2011). *Ranunculus* will not need plant growth regulators when grown under the proper temperatures (Nau, 2011).

**Container Sizes:** From a 288 plug, a 4"/10cm pot is recommended

**Insect/Diseases:** The major pests of *Ranunculus* are Thrips, aphids, leaf miners, and spider mites (Nau, 2011). Pythium, botrytis, *Fusarium*, and powdery mildew are some of the biggest disease problems (Nau, 2011).

### **Market Niche**

The most appropriate niche is late winter and early spring sales (Nau, 2011). This is best because you will have some adequate warm days and there will be fewer crops available to fulfill consumers desire to plant early (Nau, 2011).

### **Target Sale Date**

Since this is a perennial crop the best time for sale would throughout the entire growing season

### **Programmability**

Year-round

### **Potential Crop Limitations**

Based on the information collected, the biggest limitation would be the aggressive/invasive nature of the plant. This may be too much for some growers and they may look for other perennial crops. Conversely, plant breeders could make the plant sterile to prevent invasiveness.

### **Competitive Crops**

Some crops that may compete with this would be other ground cover crops, cut flower types, pollinator crops, and perennials.

### **Marketing Story**

Introducing a ground cover crop that will expand and grow faster than most. Creeping buttercup will provide radiant yellow flowers with a pleasant green canopy of lush foliage. The fast spreading characteristics of *Ranunculus repens* will provide you with a carpet of foliage in no time at all.

### **Product Information Guide/Crop Schedule**

Stolons/bareroot of the *Ranunculus repens* plant can be obtained from distributors or can be planted from seed depending on what the grower prefers (Nau, 2011). *Ranunculus repens* will take around 14-15 weeks from seed to be ready for sale in a retail setting.

Seeds should be started around mid-January to be ready by mid-April. All information in the plant production schedule was taken from Ball Redbook Volume 2 by Jim Nau, 2011.

Table 3: Plant Production Schedule

Scientific name	Common name	Category	Week 1 (mid-January)
<i>Ranunculus repens</i>	Creeping Buttercup	Perennial	Sow seed into sterile, well-draining, germination medium. 128 plug tray is preferred. Cover lightly with coarse vermiculite and keep media moist. Maintain a substrate temperature of 50-55°F (10-13°C), with a pH at 5.5-5.8. Light is not required for germination to occur.

Week 2	Week 3	Week 4 (early February)
Maintain substrate temperature of 50-55°F (10-13°C), with a pH at 5.5-5.8.	Move trays out of misting house and into greenhouse to prepare for stage 2. Increase light to 500-1,500 f.c. (5.4-17 k lux). Begin feeding weekly with 50-75 ppm with 14-4-14	Stage 2 continued. Maintain soil temperatures and reduce irrigation to improve root penetration into the media. Maintain light levels and feeding requirements

Week 5	Week 6	Week 7
<p>Beginning of Stage 3. Raise substrate temperature to 55-60°F (13-15°C). Increase light levels to 1,500-2,500 f.c. (17-27 k lux). Increase weekly feed to 100-150 ppm from 14-0-14.</p>	<p>Stage 3 continued. Maintain light levels and feeding.</p>	<p>Stage 3 continued. Maintain light levels and feeding</p>

Week 8 (Early March)	Week 9	Week 10
<p>Stage 3 continued. Maintain light levels and feeding</p>	<p>Stage 3 continued. Maintain light levels and feeding</p>	<p>Beginning of Stage 4. Harden plants for 7 days prior to transplant. Increase light to 2,000-3,000 f.c. (22-32 k lux), continue weekly feeding</p>

Week 11	Week 12	Week 13 (Early April)
<p>Transplant plugs into a well-drained, disease-free medium with a pH of 5.5-6.0. Plant 1 plug into 4" (10 cm) pot and 1-3 plugs into 6" (15 cm) pot. Provide light levels up to 5,000 f.c. (54 k lux).</p>	<p>Same as week 11. Watch for flowering. When flowering begins, reduce light to 2,000-2,500 f.c. (22-27 k lux). Fertilize every other watering with 150-200 ppm from 15-5-15.</p>	<p>Same as week 12. Watch for flowering. When flowering begins, reduce light to 2,000-2,500 f.c. (22-27 k lux). Fertilize every other watering with 150-200 ppm from 15-5-15.</p>

Week 14	Week 15 (Mid-April)
<p>Space plants to prevent stretching. Grow at 55-60°F (13-15°C) days and 40-50°F (4-10°C) nights. Maintain fertilizing schedule.</p>	<p>Space plants to prevent stretching. Grow at 55-60°F (13-15°C) days and 40-50°F (4-10°C) nights. Maintain fertilizing schedule.</p>

Creeping buttercup will thrive in a variety of controlled environments. From greenhouse to hoop-house, most will be sufficient to cultivate this perennial crop. Since bareroot specimens are somewhat challenging to acquire, seed propagation may be the best option. Seeds will germinate in about a week and will not require light (Nau, 2011). *Ranunculus* tends to be a slow growing seedling and the grower will need to maintain a moist environment around the seed coat (Nau, 2011). In order to acquire the fastest flowering, it is recommended to maintain day temperatures closest to 60°F (15°C) (Nau, 2011). If temperatures fall below 50°F (10°C) this will result in branching (Nau, 2011). If temperatures go above 65°F (18° C) this will result in stretching, leggy growth, plant dormancy, or even premature flowering (Nau, 2011). Stolons may need to be trimmed if they become too long in order to prevent tangling with the other plants in the flat. Overall, this plant will not present too many challenges to the grower who is producing for a retail market.

## Literature Cited

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**Bluebird Nursery:**

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