

# The Fameflower

*(Talinum sediforme)*

## Portrait of a Northwest Endemic

by Trevor Goward & Helen Knight

### ABSTRACT

The Fameflower (*Talinum sediforme* von Poellnitz), a member of the Portulacaceae, is known to occur in Canada only in the southern interior of British Columbia. Here it has been verified from 13 localities, nine of which were visited by the authors in 1988 and 1989. Within these localities 24,588 plants were found colonizing a combined area of nearly 11 ha, and covering a total range of 7000 km<sup>2</sup>. By comparison, the Fameflower is known in the United States from only six localities over a range of about 1000 km<sup>2</sup>. Thus, almost 90% of its global range occurs in Canada.

The species has a distinctive ecology, being restricted to rocky, well-drained soils over highly brecciated lava outcrops at elevations of between 800 m and 1500 m. The lower limits of this vertical range seem to be controlled by increasing aridity, and the upper limits by competition from other vascular plants and, perhaps, mosses.

Though no single locality is considered critical to the survival of the Fameflower, the Mara Hill locality (north of Kamloops) contains approximately 40% of the plants documented in the course of this study. Accordingly, it is recommended that part or all of this area be given special protection.

### INTRODUCTION

"I first found this little plant at Brigade Lake in June, 1924, dug up a lot of plants, and started my first little rockery...." These words appeared in the November 1938 issue of B.C.'s early horticultural journal, *The Garden Beautiful*. Written by Kamloops resident Mrs. K. C. Way, they referred to the Fameflower (*Talinum sediforme* von Poellnitz), a plant Mrs. Way had grown and propagated and passed around to her horticultural friends years before it was "discovered" by science.

As it turned out, Mrs. Way had stumbled upon one of the Pacific Northwest's most geographically restricted vascular plants. To this day, the Fameflower is known from only about 20 localities in south-central British Columbia and adjacent Washington. Different, however, from most other plants having this general distribution, the Fameflower is primarily a Canadian species: approximately 90% of its total range is located north of the 49th parallel.

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Nearly a decade after Mrs. Way's unofficial discovery of the Fameflower, it finally received scientific recognition when three botanists independently gave it three different latin names. Of these, the name *Talinum wayae*, which appeared in 1934, was intended to commemorate Mrs. Way. That name, however, was soon found to have been preceded (by one month) by *Talinum okanoganense*, which has long been the correct (i.e., earliest) name; this is the name that appears in all the standard references. Lately, however, it has been established that *T. okanoganense* was actually preceded by an even earlier name, *T. sediforme*, published by a German botanist in 1933.

Northwest prior to being described. As early as 1934, for example, Carl English (1934) noted that "the ease with which it adapts itself to conditions in the garden, its neat, compact habit of growth and the profusion of flowers, which it offers throughout the summer, combine to make this new plant an admirable subject for horticultural use in rock gardens." More recently, it has been listed for sale in various seed catalogues in the United States and Canada, including that of the Alpine Garden Club of British Columbia.

We were first introduced to the Fameflower in June of 1987 on Little Wheeler Mountain, north of Kamloops, by Bill Huxley, a well-known naturalist of the area. Though none of the flowers were blooming at the time, we were intrigued that such an attractive plant could persist in such an arid setting. We decided to make a study of the Fameflower, wishing to unravel some of the details of its distribution, ecology and biology. Ultimately, our study (conducted between March 1988 and August 1989) expanded to a report which we submitted to COSEWIC, the Committee on the Status of Endangered Wildlife in Canada (Goward & Knight 1989).



Alan Vyse

Figure 1. In spring the characteristic form of Fameflower contrasts well with the volcanic screens on which it grows.

Largely owing to Mrs. Way, the Fameflower was already familiar to many alpine gardeners throughout the

## DESCRIPTION

The Fameflower (Figure 1) consists of inconspicuous, saucer-sized mats that are often overlooked on the barren volcanic outcrops on which they occur. When not in bloom, this species is often mistaken for a stonecrop — especially *Sedum lanceolatum*, the Lance-leaved Stonecrop, with which it sometimes grows. To tell the two apart requires close examination with a hand lens.



Some differences that should help distinguish between them are shown in Table 1.

Any confusion vanishes once the Fameflower comes into bloom, for then its whitish, cupped blossoms identify it as a member of the purslane family (Portulacaceae), to which Spring Beauty (*Claytonia lanceolata*) and Miner's Lettuce (*Montia perfoliata*) also belong. By contrast, the Lance-leaved Stonecrop has yellow flowers, and belongs to the stonecrop family (Crassulaceae).

Each of the Fameflower's blossoms is about 1 cm across, and is comprised of two deciduous sepals, five or six rather broad, but pointed-tipped petals, about 20 yellowish anthers, and, at the centre, a pistil having a three-lobed style. Later in the season, the flowers are replaced by three-valved seed capsules.

The species is by no means genetically homogeneous. During the course of field studies, we observed considerable variation in flower colour, from white to creamy, or suffused with varying shades of pink. Contrary to the assertion by Eastwood (1934), this does not appear to be a function of age, exposure, substrate, or other environmental factors. Rather, it seems to reflect a genetically linked variation in betacyanin.

Even more variable is leaf colour, and here again the differences apparently reflect different concentrations of betacyanin. It is interesting to note that the leaves of this species are generally characterized as grey-green (English 1934, Foster 1968, Wiley 1969) or bluish green (Eastwood 1934), though in fact, they may frequently be medium green or even reddish. Quite differently pigmented plants can often be found growing side by side, so it seems unlikely that the reddish coloration is

related to drought stress, as noted in other species of *Talinum* (Stewart Ware 1990, pers. comm.). Similar leaf pigment polymorphisms have been observed also in other succulents. (Griffiths & Ganders 1983).

Table 1. Features of Fameflower and stonecrop

CHARACTER	FAMEFLOWER	STONECROP
Leaves	deciduous	perennial (partly)
Mature leaves	2-5 (6) mm long	6-8 mm long
Margins of oldest leaves	whitish, narrowly winged	greenish, fleshy
Tips of oldest leaves	sharply pointed	blunt
Taproot	woody, wrinkled, reddish brown	fleshy, smooth, deep maroon

**DISTRIBUTION**

The genus *Talinum* contains about 50 species, most of which are restricted to tropical and warm temperate latitudes (von Poellnitz 1934). Two main centres of distribution can be distinguished: one in Africa (approximately 11 species) and the other in Mexico and the American Southwest (approximately 25 species). The precursor(s) of the Fameflower probably originated in the latter centre.

Although Hitchcock et al. (1955-1969) describe the American range of this species as "the lower mountains of Okanogan Co., Washington," it is now known to also extend eastward to adjacent Ferry County. John Gamon, a botanist with the Washington Natural Heritage Program, has advised us that approximately six localities are now

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known for these two counties. Thus, the total known range of the Fameflower in the United States is approximately 1000 km<sup>2</sup> (Figure 2).

By contrast, the Canadian range is substantially larger, if not quite so concentrated. To date, 13 localities have been identified, ranging as far west as Wallhachin (121° 10' W), as far north as Opax Hill (50° 48' N), and as far east as Okanagan Lake (119° 37' W). This represents a total area of approximately 7000 km<sup>2</sup> (Figure 2) — almost 90% of the total world range. We list the Canadian localities from north to south in Table 2.

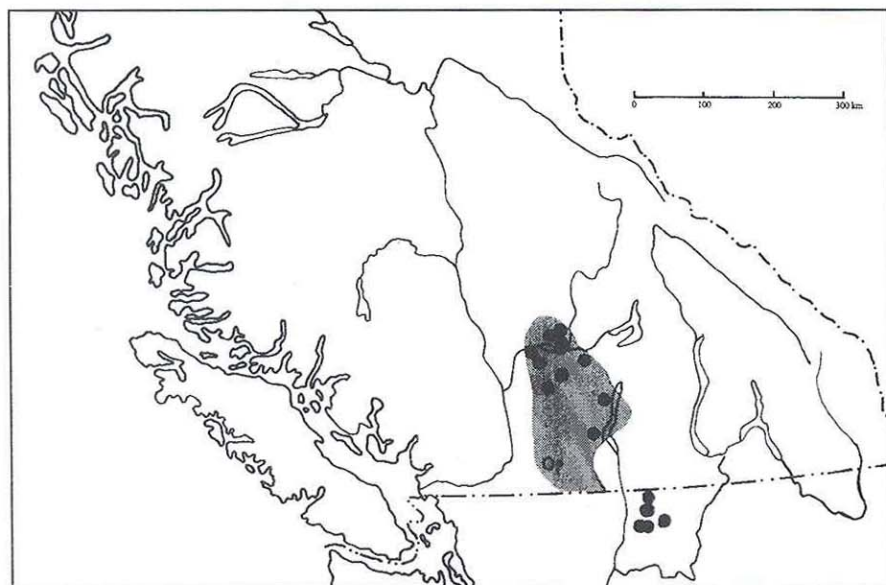


Figure 2. Fameflower: known world distribution and potential range in Canada

A further locality is given by von Poellnitz (1933), the German botanist who gave the Fameflower its scientific name. According to von Poellnitz, the type specimen (i.e., the specimen upon which the name *T. sediforme* is based) is labeled as having been collected by John

Jeffrey at “49 degrees N” near “the Seme-ke-mele-River” on 15 June 1851.

It is possible that this designation of the type locality may actually be based on an error in labeling. To begin with, no botanist is known to have explored this portion of the province until the boundary survey of 1859 and 1860. Also, though “Seme-ke-mele-River” is clearly an early orthographic variant of “Similkameen River,” yet in the 19th century this name was applied variously to what are now called the Otter, the Tulameen, the Similkameen, and the Pasayten Rivers (Bob Harris 1990, pers. comm.); it may be significant that no subsequent collections are known from any of these drainages. Future collecting in this region will almost certainly shed light on this intriguing problem.

During the course of our field work, we visited approximately 34 sites in nine localities. The total (combined) area colonized by this species within these localities was determined to be 107,135 m<sup>2</sup>, or almost 11 ha. Individual sites ranged in size from 10 m<sup>2</sup> to about 60,000 m<sup>2</sup>. By far the most productive locality was Mara Hill, just north of Kamloops, on which we noted approximately 9.8 ha of Fameflower distributed over at least seven sites.

The Fameflower has a total elevational range in B.C. of 800 m to 1500 m, though most populations occur between 1000 and 1200 m. In all cases, it favours either hilltops or escarpments, often of southerly or southwesterly exposure. Such outcroppings represent remnants of a vast, heterogeneous, volcanic sheet which covered much of the Interior Plateau about 45 million years ago, i.e., during the early to middle Tertiary (Jones 1959), and probably the Eocene (Hickson 1989).



It is primarily the distribution of these volcanic remnants which, in combination with appropriate climatic conditions (see below), determines the occurrence of the Fameflower throughout its range. In B.C., these requirements are met only in the drainages of the Okanagan and Thompson Rivers, i.e., in the Thompson Plateau subdivision of Holland (1964), or the Thompson-Okanagan Plateau Ecoregion of Demarchi et al. (1990).

More specifically, sites favoured by the Fameflower are located at or near erosional margins of the flat-lying lavas. Here the land surface shifts from level to precipitous, and the Fameflower tends to occupy the slopes of low relief dividing these two topographic extremes. Elsewhere, the Thompson Plateau is overlain by a thick mantle of glacial debris (Fulton 1975) which favours colonization by other plant species. These in turn effectively exclude the Fameflower through competition.

It is interesting that the modern range of the Fameflower was entirely ice-covered at the height of the Fraser glaciation (see, for example, Prest 1969). This suggests that it must have passed much of the last Ice Age in refugia entirely south of its present range, and that it has subsequently disappeared from those areas. Why a species of dry, warm, open exposures did not persist in at least scattered populations farther south is open to conjecture. Perhaps it was excluded by competition from various reinvading xerophytes including species of bitterroot, phlox, buckwheat, and cactus. None of these, at any rate, are nearly as diverse within the present range of the Fameflower as they are farther south.

Table 2. Canadian Fameflower localities.

<b>Opax Hill</b>	(50° 48' N, 120° 30' W)	1250 m.
<b>Little Wheeler Mountain</b>	(50° 46' N, 120° 28' W)	1000 m.
<b>Baldy Mountain</b>	(50° 46' N, 120° 33' W)	1050 m - 1100 m.
<b>Walhachin</b>	(50° 45' N, 121° 10' W)	1100 m.
<b>Dewdrop Range</b>	(50° 45' N, 120° 34' W)	900 m - 1150 m.
<b>Mara Hill</b>	(50° 44' N, 120° 27' W)	950 m - 1000 m.
<b>The "Pimple"</b>	(50° 44' N, 120° 31' W)	800 m.
<b>Savona Mountain</b>	(50° 42' N, 120° 50' W)	1500 m.
<b>Buse Hill</b>	(50° 36' N, 120° 01' W)	1050 m - 1150 m.
<b>Shumway Hill</b>	(50° 32' N, 120° 17' W)	1100 m.
<b>Stump Lake</b>	(50° 24' N, 120° 20' W)	1050 m.
<b>Shorts Creek</b>	(50° 09' N, 119° 37' W)	1500 m.
<b>McDougall Rim</b>	(49° 54' N, 119° 35' W)	1000 m.

**CLIMATE**

The region occupied by the Fameflower can be characterized as having a mild continental climate, with an annual temperature range of about 25° C. At Kamloops, for example, near its northern limits, the average mean temperature varies from -6° C in January to 20.9° C in July (Environment Canada 1975a).

Precipitation is fairly evenly distributed through the year, with a slight peak in winter and another (more pronounced) peak in summer, especially in June. On the other hand, periods of drought tend to be most intense during the summer months of July, August, and September (Williams 1982). Total annual precipitation values are 254 mm for Kamloops and 320 mm for Kelowna (Environment Canada 1975b), though precipitation is certainly somewhat heavier in the upland sites occupied by the Fameflower (see, for example, Lloyd et al. 1990). Absolute precipitation values, however, must be relatively meaningless in the exposed, and invariably well-drained, sites inhabited by this species.

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The same observation can be made in connection with annual snowfall. Though most localities probably receive between 93 cm and 150 cm of snow each year (Lloyd et al. 1990), very little snow actually persists through the winter, owing to drifting, melting, and sublimation. This suggests that at many sites the Fameflower probably derives little direct benefit (i.e., protection from ground frost) from winter snowcover, though we did observe a few populations that seemed to occupy sites of relatively heavy snow accumulation.

Precipitation during the growing season is highly variable. As pointed out by Williams (1982), rainfall events during May tend to be frequent, but of low intensity. Although rain is no more common in June, July, and August, it is much more intense, owing to a three-fold increase in the incidence of thunderstorms during this period. The thunderstorms tend to occur in the late afternoon, during the period of maximum surface heating, and for this reason much of the associated rainfall is probably lost to evaporation. Because the Fameflower typically grows in exposed, south-facing or southwest-facing outcrops having a very shallow soil layer, it is doubtless profoundly affected by such patterns; very probably its lower limits are set at about 800 m by the extreme moisture deficit below this elevation.

## HABITAT

The Fameflower seems to be restricted entirely to shallow, well drained soils that have derived from highly friable, brecciated volcanic rock. Hickson (1989) has shown that the rock in question is chemically heterogeneous,

suggesting that the Fameflower's habitat is more closely associated with the weathering properties of the parent material than it is with bedrock chemistry.

## ASSOCIATED SPECIES

Most of the outcrops inhabited by the Fameflower are only sparsely colonized by other species of vascular plants. A few of the most common are: Lance-leaved Stonecrop, Bluebunch Wheatgrass (*Agropyron spicatum*), Spikemoss (*Selaginella densa*), and more infrequently, Cutleaf Daisy (*Erigeron compositus*), Rosy Pussytoes (*Antennaria microphylla*), Prickly Pear Cactus (*Opuntia fragilis*), and Kinnikinnick (*Arctostaphylos uva-ursi*). In the southern part of the range, from Kelowna southward, Bitterroot (*Lewisia rediviva*) also sometimes occurs. By far the most common species among the cryptogams is the moss, *Tortula ruralis*.

In most of the sites at which the Fameflower occurs, it is clearly the dominant species. With the exception of Bluebunch Wheatgrass, Spikemoss, *T. ruralis*, and rarely, Lance-leaved Stonecrop, other vascular plants occur very sparsely indeed, accounting for perhaps less than 5% of the combined cover.

The Fameflower grows most vigorously in early successional sites, and therefore depends either on gradual erosion or, in more stable situations, on shifting patterns of competing vegetation. In some localities we noted a successional relationship with Spikemoss. Initially the Spikemoss grows outward in roughly circular patches. Where overrun by these, the Fameflower gradually weakens and may



die out. In time, however, the Spikemoss itself begins to die, usually from the centre outward. Soon the Fameflower reestablishes in the newly vacant soil, presumably from seed.

Elsewhere, a similar dynamic equilibrium is apparently established with the moss, *T. ruralis*. In moister sites, however, and especially at higher elevations, Spikemoss and *T. ruralis* both tend to exclude the Fameflower altogether.

### PHENOLOGY

In keeping with the extremely arid conditions under which it grows, the Fameflower has a rather contracted growing season. Typically the leaves do not begin to expand until early to mid-April, though in the warmest sites bud formation is well underway by late April and is followed by flowering about a week later. The flowers do not appear all at once, but continue to open at irregular intervals through mid- to late July, possibly longer. Each flower lasts only a day (Foster 1968).

Following flowering, the fruits mature to a three-cleft capsule which dehisces vertically, releasing approximately 15 to 25 black, kidney-shaped seeds. The seeds, about 1 mm in length, possess no obvious specialized adaptation for dispersal, and are probably scattered mechanically by wind action. However, Gregson (1987) has noted that the seeds may sometimes be carried away by roving ants. At any rate, the first seeds are ripe by early June, possibly late May in some years. By the first or second week of August, the leaves have withered and fallen, and the Fameflower becomes difficult to locate until the following spring.



Figure 3. Each of the Fameflower's blossoms is about 1 cm across

### STATUS IN CANADA

Prior to our field studies, and based on specimens deposited at UBC, UVic and the National Museum in Ottawa, the Fameflower had been collected from only six Canadian localities, though we now know it from a total of 14 localities. The candidate areas for further investigation (Figure 2) promise to considerably increase the known range in years to come. This supports Lewis Clark's prediction that the Fameflower may ultimately be found to be "less uncommon than is indicated by the paucity of reports" (Clark 1973).

At the present time the Fameflower appears to be well established in B.C. In most of the localities visited we detected at least a few very young seedlings, some of which were certainly less than a year old. That germination has occurred during the years 1985 to 1988 is noteworthy in light of the severe drought conditions which prevailed in southern British Columbia during this period. On

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the other hand, we also noted a number of older plants which seem to have died in recent years.

It is important to emphasize that the most productive sites are situated adjacent to some of the largest population centres in the southern interior, including Kamloops (pop. 62,000) and Kelowna (pop. 76,000). Though this appears to pose little immediate threat to the survival of the Fameflower over most of its range, a potential does exist for damage to at least the more accessible populations. In our opinion, the activities of recreationists, especially ATV users, constitute the greatest long-term threat to this species.

Within the nine localities visited, we estimated a total of 24,588 individual plants. Their distribution is such that no single locality can properly be called critical to the survival of this species. Even so, we recommend that special protection be accorded to part or all of the Mara Hill site, thereby helping to ensure the preservation of what seems to be the most productive Fameflower locality in Canada, if not the world. Roughly 90% of the total known distribution in Canada (as measured by area), and 40% of the plants documented during the course of our field studies, occur here.

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