

The nature and distribution of daffodil pickers' rash

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The rash associated with picking daffodils has long been recognized, but the distribution and differing types of lesions have not been explained. This study, from observations in the field, attempts to clarify the position. The method of picking and then gathering the flowers explains the development of the rash at the points of contact of plant sap with skin. Crystals of calcium oxalate in the sap, in conjunction with alkaloids, act as an irritant, and also cause the characteristic sores.

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The western half of Cornwall, which includes the Isles of Scilly, 28 miles west of Land's End, is a major commercial source of the *Narcissus* species, Amaryllidaceae. Small sheltered fields and a warm climate result in the first blooms being available as early as October to be exported world wide. The main flower picking season extends until March or April, for which a large casual labour force is employed. Daffodil rash is an acknowledged hazard of the work. Because the season is short and the rash therefore self-limiting, pickers rarely present to a doctor. Our observations have been obtained primarily in the field.

Methods and Observations

A variable proportion of the work force can be affected by the so-called daffodil itch, or lily rash (1). This was first described by Walsh (2) in 1910, in relation to flower pickers on the Isles of Scilly, where the industry started in the late 1800s. Hands and wrists are primarily affected, as close observation of the details of picking will confirm. Picking takes place when the flowers are still closed. The picker slides a hand down to the base of the stem (Fig. 1) and then snaps off the stalk (Fig. 2). The finger webs are particularly vulnerable to trauma during this process. They catch on the ends of the leaves as the fingers are slid down to the base of the stem. These abrasions are irritated by the sap to produce characteristic granulomatous

sores (Fig. 3). Paronychia may also occur. As the flowers are picked, some of the sap drops onto the wrist and forearm, causing further rash, which may be eczematous or granulomatous (Fig. 4). Subsequent handling of the flowers varies between the mainland and the islands and accounts for the variation in distribution of the rash.

On the mainland, the flowers are bunched in the field. The picker holds the flowers in the other hand until a bunch of 10 has been collected. The

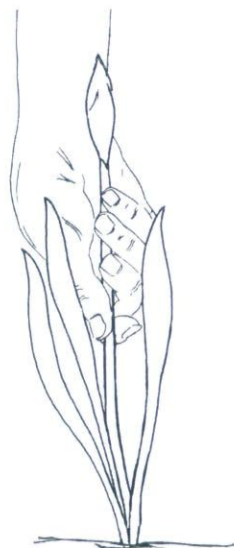


Fig. 1. The picker sliding a hand down to the base of stem.

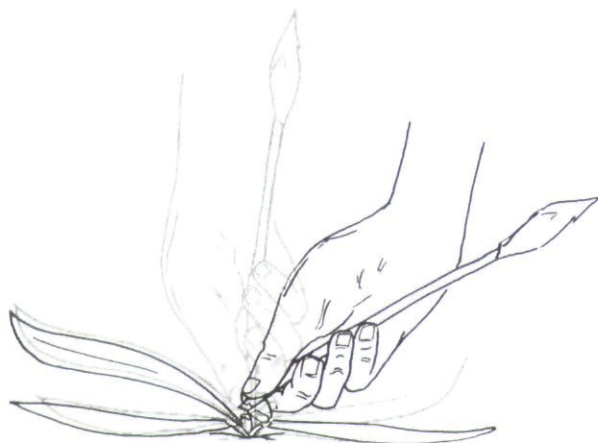


Fig. 2. The stalk being snapped off.



Fig. 3. Characteristic granuloma in finger web.

stems are then levelled against the palm and bunched with an elastic band. Mainland pickers are paid by the bunch, and hold onto as many as possible. Flowers are stacked along the arm, under the chin, and under the axillae and this practice is reflected by the more extensive distribution of the eczema, at these sites.

On the Isles of Scilly, the method of picking is the same, but the flowers are then put into baskets before being transported to sheds for bunching and packing. The workers are paid an hourly rate and do not have the same financial incentive to hold as many flowers as possible. The primary rash is therefore confined to hand and wrist. In contrast, the packers tend not to get the sores because their hands are not traumatized by the leaves. They only get the typical eczematous reaction. In all groups, secondary transfer of sap by hand can occur. This affects the face in both sexes, and also the scrotum in men, when they pause to urinate in the corner of the field.

Daffodil bulbs are lifted in July or August, after

3 years of flowering. For a 6-week period, seasonal workers are again employed. Mechanical means are used to bring the bulbs to the surface, which are then gathered into baskets by hand. The baskets are carried to the sheds where the bulbs are treated and stored.

As the process is partly mechanized and the bulbs are dry, the pickers are less hampered by wearing gloves and irritant contact dermatitis is less of a problem. Simple domestic rubber gloves are normally worn, although nitrile gloves may offer more protection (3). After lifting, the bulbs are sprayed with powerful anti-fungal agents such as Storite® (thiabendazole) or Yaltox® (carbofuran) to try to prevent base rot and stave off the bulb fly. The bulb fly can kill off an entire crop, so preventive methods are of great economic importance to the grower. In late August or September, the bulbs are planted, and sprayed with weed killer and anti-fungal agents. Spraying continues at 3-weekly intervals throughout the growing period and traces of fungicides may still be on the leaves



Fig. 4. Typical rash on back of hand and wrist.



Fig. 5. Needle-shaped calcium oxalate crystals.

at the time of flower picking. These may also contribute to the daffodil rash, or even cause a true allergic contact dermatitis similar to that seen with fungicides in the tulip industry (4).

Apart from the problems associated with irritant daffodil sap, pickers suffer the consequences of long hours bent over the rows of flowers snapping off the stems with a twist of the wrist. Backache and tenosynovitis are common. Less-experienced pickers wearing unsuitable clothing often develop chilblains on the buttocks and the back of the thighs.

Discussion

Daffodil rash is primarily an irritant contact dermatitis (5), affecting areas of skin that come into direct contact with the sap. A very experienced picker can gather as many as 2000 bunches, that is 20000 flowers, per day and thus has prolonged contact with a considerable amount of sap. Regular pickers avoid contact as much as possible by wearing protective rubber gloves, a precaution often not followed by the novice and more itinerant picker. Daffodil sap contains needle-shaped bundles of calcium oxalate crystals, known as raphides (Fig. 5) (6). These are gathered into bundles within 'slime vessels', which also contain slime and alkaloids and extend through the stems over a considerable length. When the daffodil stem is snapped off during picking, the contents of the disrupted slime vessels are forcibly discharged by the turgor of the surrounding intact cells (6). Needle-shaped crystals thus ejected are capable of penetrating intact skin (1) to produce an irritant effect. The physical structure of the crystals themselves may determine the degree of irritation. A detailed electron microscopy study of raphide structure (7) has suggested that elongated crystals with barbs produce a greater effect. However, calcium oxalate crystals from Amaryllidaceae were not examined specifically in this study. At present, we are looking at the characteristics of crystals found in various *Narcissus* cultivars, as different varieties produce differing degrees of skin irritation.

The highly scented multi-flowered soleil d'or or paper whites (both Tazettae species) rarely cause any problems. They are the very early varieties grown almost exclusively on the Scillies. The trumpet daffodils (pseudonarcissi), such as King Alfred, Golden Ducat or Princeps, are far more irritant. Pickers are aware of these differences. When gathering Tazettae, they hold the flowers with stems facing inwards, but when picking pseudonarcissi they turn round the stems, to avoid sap dripping onto their clothing. The perceived increase in irritation

associated with Golden Ducats may be due to the fact that they are picked later in the season when less protective clothing is worn during the warmer weather.

Allergic reactions to daffodils have rarely been observed (5). At least 15 alkaloids have been isolated from narcissi (8) and it is possible that these penetrate the skin with the calcium oxalate crystals to produce an allergic response in susceptible individuals (9). Exhaustive studies by Gude (10) isolated only 2 alkaloids that were able to produce a weakly positive reaction in patch tests on sensitized guinea pigs. These were identified as homolycorin and masonin, but neither substance was detected in stems or leaves of *Narcissus pseudonarcissus*.

They were found mainly in the bulbs and roots with a small amount in the petals. From these experiments, the ability of *Narcissus* to produce an allergic response was concluded to be poor. This would seem to be supported by a recent study of occupational allergic contact dermatitis from plants (11). Out of a total of 12 patients collected over a 14-year period only 2 showed positive patch test results to narcissi.

Pesticides may also contribute to an allergic contact dermatitis. From the time of bulb planting to their lifting 3 years later, narcissi are subjected to regular spraying with a variety of toxic solutions. The specific chemicals are used in rotation, as recommended by the Ministry of Agriculture, in an effort to control the bulb fly, whose effects can decimate the entire crop. Recent work has shown an apparent increase in dermatitis from pesticides in general (12), corroborated by the work of Thiboutot et al. (13) in relation to florists. Certainly there were flower farmers whom we met in the Scilly islands who were unable to participate in bulb spraying because of the severity of the rash they developed.

At present, 1295 hectares are farmed for narcissi in the South West of England. This is a major commercial venture, involving many millions of pounds and bringing much needed income to our area. A 30% expansion of the industry is planned over the next 3 years and will involve a large increase in the seasonal workforce, 2/3 of whom are employed in the spring for flower picking and processing. Daffodil pickers' rash has therefore economic implications.

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