

Primula obconica – is contact allergy on the decline?

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Primula obconica, a member of the Primulaceae family, was introduced to Britain from China in 1880. *P. obconica* cultivars, which are reputed to contain less primin, have been developed over the past number of years in an attempt to reduce the incidence of allergic contact dermatitis. Primin (2-methoxy-6-pentyl-1,4-benzoquinone) is the main sensitizer, although other allergens have been postulated. We believe the incidence of primula allergic contact dermatitis has fallen since the introduction of primin-free *P. obconica* into the European market and thus the aims of this study were twofold. First, to determine whether the incidence of primula allergic contact dermatitis was truly on the decline and, second, to confirm the presence of primin-free *P. obconica* in the UK. We surveyed the incidence of primula allergic contact dermatitis in the UK and compared the incidence in the period between 1995 and 2000 with a subsequent follow-up study looking at the incidence for 2002. The results showed a significant fall in primin-positive patch tests from 1995 to 2000. The follow-up results for 2002 showed a further reduction in the number of primin-positive patch tests. The yearly incidence of contact allergy to primin has fallen from 0.785% in 1995/1996 to 0.429% in 2002. This downward trend was statistically significant ($P = 0.001$). A telephone survey of UK seed suppliers and selected plant retailers was also undertaken to clarify what types of *P. obconica* were available for sale and to assess suppliers' and retailers' knowledge of the primin-free varieties. This survey showed that 50% of suppliers were selling primin-free varieties but that the majority of surveyed retailers were not currently selling any variety of *P. obconica*. Our study suggests that although the yearly incidence of contact allergy to primin has fallen significantly over the past 8 years, it is still an important allergen, and thus its inclusion in the standard series remains justified for the foreseeable future.

Keywords: plant dermatitis; primin; primula dermatitis; *Primula obconica*. © Blackwell Munksgaard, 2004.

Accepted for publication 7 August 2004

Primula obconica, a member of the Primulaceae family, was introduced to Britain from China in 1880 (1) and was soon also cultivated in the USA. The first case of allergic contact dermatitis from this species was described in the horticultural literature by White in 1888 (2) and 1889 (3). It prompted some correspondence on the subject, with further case descriptions from America and Britain (4, 5).

Primin (2-methoxy-6-pentyl-1,4-benzoquinone) is the main sensitizer, although other allergens have been postulated, such as miconidin (2-methoxy-6-pentyl-1,4-dihydroxybenzene), its biosynthetic precursor (6).

Primin is found in and on the surface of microscopic glandular hairs (trichomes), each consisting of 2–6 cells, with the highest concentration of primin usually found on the calyx (the fused bracts surrounding the flower) (7, 8). Other parts of the plant containing primin include, in

decreasing order, the pedicel (flower stalk), carpel, leaf, petiole and stem (peduncle) (9).

Sensitization to *P. obconica* can occur by direct contact with plants, while removing dead flowers and leaves, or by indirect contact, e.g. via handshakes or door handles (10, 11). Primin can be directly emitted from *P. obconica*, causing an airborne allergic reaction in some sensitized patients. Airborne allergic contact dermatitis may also be induced by small dust particles derived from the plant surface or pollen (11).

The clinical features, although variable, typically comprise of linear streaks of erythema with vesicles and bullae on the forearms and vesicles on the fingers. Facial involvement has also been reported, and affected patients may present with eyelid oedema (11). More unusual presentations include an eruption resembling erythema multiforme (12) or herpes simplex (13).

Allergic contact dermatitis from *P. obconica* is commoner in females, and also over the age of 35 years (14). Reports in the literature have previously shown that the allergen primin has accounted for 1–1.8% of positive reactions when included in a standard series (14, 15). Synthetic primin (Trolab[®], Bio Diagnostics Ltd, Upton upon Severn, UK) 0.01% pet. has been used to detect primula sensitivity (15). Although primin can be detected in several other species of primula, allergic contact dermatitis has rarely been reported from other species. Other, as yet undetermined, allergens appear to be implicated in dermatitis caused by alpine species such as *P. auricula* and *P. denticulata* (16).

In an attempt to reduce the incidence of allergic contact dermatitis, *P. obconica* cultivars, which are reputed to contain less primin, have been developed over the past number of years. A seed producer in the USA has bred a strain which is claimed to be free of the allergen, and these seeds are available commercially (17).

Aim

We believe the incidence of primula allergic contact dermatitis has fallen since the introduction of primin-free *P. obconica* into the European market and thus the aims of this study were twofold. First, to determine whether the incidence of primula allergic contact dermatitis was truly on the

decline and, second, to confirm the presence of primin-free *P. obconica* in the UK.

Methods

We surveyed the incidence of primula allergic contact dermatitis in the UK dermatology departments specializing in contact dermatitis. We compared the incidence in the period between 1995 and 2000 with a subsequent follow-up study questionnaire looking at the incidence for 2002.

We attempted to clarify the types of *P. obconica* sold in the UK by undertaking a telephone survey of seed suppliers and selected plant retailers between June and August 2002, in order to clarify the cultivars sold in the UK. The aim also was to discover whether the suppliers knew of the potential allergenicity of *P. obconica*, whether they had heard of or sold a primin-free variety and whether an increased demand for nonallergenic *P. obconica* had prompted a move towards an increase in primin-free stock. A survey of the retailers aimed to find out which major companies sell or used to sell *P. obconica*, and if so which variety, and their customers' reactions to the plant.

A questionnaire was sent to 22 contact dermatitis departments throughout the UK and Ireland. We looked at the number of primin-positive patch tests in the years 1995 or 1996, 1998 and 2000, compared with the total number of patch

Table 1. Data from individual departments

	1995/1996			1998			2000			2002		
	Primin positive	Primin negative	Total tests	Primin positive	Primin negative	Total tests	Primin positive	Primin negative	Total tests	Primin positive	Primin negative	Total tests
Liverpool	3	377	380	4	374	378	7	329	336	2	393	395
Newcastle	4	611	615	4*	718*	722*	4	579	583	4	524	528
St John's	10 (1993)	1081 (1993)	1091 (1993)	10	1157	1167	3	1054	1057	Data not available	Data not available	Data not available
Dundee	0	561	561	1	559	560	1	590	591	2	718	720
Birmingham	5	1195	1200	5	1195	1200	6	1394	1400	2	1198	1200
Oxford	4	509	513	5	478	483	2	545	547	5	565	570
Cork	1	78	79	0	158	158	1	184	185	1	135	136
Glasgow	4	836	840	1	912	913	1	890	891	2	838	840
Altnagelvin	4	296	300	1	309	310	0	208	208	0	200	200
Southampton	4 (1994)	493 (1994)	497 (1994)	0	402	402	2	618	620	Data not available	Data not available	Data not available
Bristol	2	281	283	2	402	404	3	421	424	3	432	435
Nottingham	3	339	342	7	615	622	4	644	648	3	670	673
Leeds	3	135	138	3	586	589	3	801	804	3*	428*	431*
Amersham	13	655	668	10	605	615	3	582	585	1	477	478
Sheffield	5	301	306	3	411	414	1	395	396	2*	162*	164*
Cardiff	0	463	463	3	486	489	2	318	320	1	272	273
Swansea	Data not available	Data not available	Data not available	3	285	288	2	258	260	0	178	178
Total	65	8211	8276	62	9652	9714	45	9810	9855	31	7190	7221

*Incomplete data recorded.

tests. 2 years later, we sent a follow-up questionnaire to 18 of the original 22 departments to record the primin-positive patch tests for 2002.

Two seed breeders, Goldsmith Seeds Inc (PO Box 1349, Gilroy, California 95021, USA), suppliers of Libre Series, and Schoneveld Twello b.v. (Dernhorstlaan 9, 7391 HZ, Twello, Holland), suppliers of Twilly Series ‘Touch Me[®]’, were contacted by telephone to ask if their primin-free varieties were available in the UK.

10 seed suppliers and 12 plant retailers were contacted by telephone and asked to complete a survey. Suppliers were also asked to discuss what they knew about the development of primin-free varieties, and their experience regarding demand for and/or complaints about *P. obconica* from their customers.

Results

Incidence of positive patch tests

Of the original 22 questionnaires, 21 replies (95.45% response rate) were received. Data from 17 of 21 centres were analysed (Table 1). 4 centres were excluded (2 did not record their results, 1 recorded limited results and 1 centre performed photobiology patch testing exclusively). In the follow-up study, 17 of 18 questionnaires were returned for analysis (94.44% response rate). 13 of the 17 centres had recorded their data for the whole year, 2 (11.76%) of the 17 centres had data for half of the year and 2 centres were not currently recording their data (Tables 1 and 2).

The results (Table 3) showed a significant fall in primin-positive patch tests from 1995 to 2000, despite an overall increase in the total number of patch tests performed over the same period. The follow-up results for 2002 showed a further reduction in the percentage of primin-positive patch tests.

The yearly incidence of contact allergy to primin has fallen from 0.785% in 1995/1996 to 0.429% in

2002 (Tables 4 and Fig. 1). This downward trend was statistically significant ($P = 0.001$).

Survey of plant breeders and suppliers

The 2 seed breeders, Goldsmith Seeds Inc and Schoneveld Twello b.V., confirmed that their plants were primin free and were available on the European market.

The results of the telephone survey to suppliers and retailers, as demonstrated in Tables 5 and 6, showed that 90% of seed suppliers were aware that the older varieties of *P. obconica* can cause an allergic reaction, whereas only 60% of them were aware that new primin-free varieties were now being bred.

50% of suppliers were in fact selling these primin-free varieties, with 60% of them stocking the primin-free variety Libre exclusively. The reasons given by the 50% of suppliers who were not selling the primin-free varieties ranged from not knowing that they existed to stating that *P. obconica* in general ‘wasn’t a great seller’. Presently all the seed suppliers with primin-free *P. obconica* stock the Libre variety, but one supplier is hoping shortly to introduce the Twilly Series ‘Touch Me[®]’.

The majority of the retailers, 9 of 10 (90%), were not currently selling any variety of *P. obconica*. They reported ‘it was not a great seller’ because of lack of public demand, poor shelf life and higher expense due to low profitability for growers. The 1 retailer stocking *P. obconica* is selling the primin-free Twilly Series ‘Touch Me[®]’.

Table 2. 2002 questionnaire response

Centres	Results
2/18	Not all data recorded
1/18	No reply
13/18	Total data recorded
2/18	No data recorded

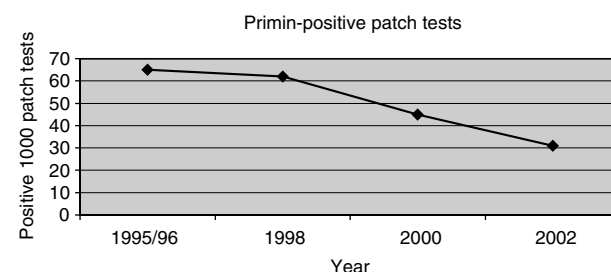
Table 3. Patch test results

Year	Primin positive	Primin negative	Total patch test
1995/1996	65	8211	8276
1998	62	9652	9714
2000	45	9810	9855
2002	31	7190	7221

Table 4. Yearly incidence of contact allergy to primin

Year	Incidence (%)	95% confidence interval
1995/1996	0.785	0.61–1.0
1998	0.638	0.49–0.82
2000	0.457	0.33–0.61
2002	0.429	0.29–0.61

Trend downwards $P = 0.001$.



Downward trend $P = 0.001$

Fig. 1. Falling incidence of primin-positive patch tests.

Table 5. Telephone survey results from suppliers

Seed suppliers	Question 1 Are you aware <i>Primula obconica</i> can cause an allergic reaction?	Question 2 Are you aware of primin-free <i>P. obconica</i> ?	Question 3 Do you sell any nonallergenic varieties? If yes, who is/are your supplier(s). If no, why not?	Question 4 Have the varieties of <i>P. obconica</i> that you stock changed over last few years? If yes, do these changes favour nonallergenic varieties?
1	Yes	Yes	Yes, Libre supplied by Goldsmith Seeds	Yes, stock changed to Libre exclusively
2	Yes	No	No, <i>Primula</i> in general is not a great seller	
3	Yes	Yes	Yes, Libre supplied by Colegraves	Yes, changed to Libre
4	Yes	No	No, not aware of nonallergenic varieties	
5	Yes	Yes	No, but planning to introduce Twilly Series 'Touch Me [®] ', but the variety is new and seed performance could be improved	
6	No	No	Yes, Libre supplied by Goldsmith	No change in stock, sell lots of varieties of <i>P. obconica</i> , not aware Libre was primin free
7	Yes	Yes	Yes, Libre supplied by Colegraves and/or Goldsmith	Yes, changed to Libre
8	Yes	Yes	No, no great demand	
9	Yes	Yes	Yes, Libre supplied by Goldsmith	No, stock remains constant with both primin-free and regular varieties being stocked
10	Yes	No	No, not aware of nonallergenic varieties	

Discussion

Roed-Petersen and Hjorth (18) predicted in 1976 that reluctance by florists to stock *P. obconica* might cause a decline in the incidence of primula dermatitis; on the contrary, Fernández de Corres et al. (9) reported that primula plant production was increasing every year according to data from the Aalsmeer flower market in Holland.

Primin-free *P. obconica* strains have also been introduced to the European market over recent

years; these cultivars are similar in growth, appearance and colour to the allergenic varieties. Christensen and Larsen (19) undertook to prove that these newer varieties were indeed primin-free, as earlier primin-free cultivars such as Reizfrei (20) had subsequently been shown to contain primin. The authors have shown that these newer genotypes have indeed lost their ability to produce primin. As nurserymen in Denmark now produce these hypoallergenic varieties, a

Table 6. Telephone survey results from retailers

Retailers	Question 1 Do you now or have ever sold any variety of <i>Primula obconica</i> . If so, what variety?	Question 2 Who is/are your suppliers?	Question 3 Have you had any complaints from the public regarding <i>P. obconica</i> ?
1	No		
2	No		
3	Uncertain		
4	No		
5	Yes, in the past, sold 4 years ago, unsure of variety		No complaints, stopped selling them due to poor shelf life
6	Yes, in the past, stopped in 1997, was Twilly Series Touch Me [®]		No complaints
7	No		
8	Survey not answered	Survey not answered	Survey not answered
9	No		
10	No		
11	Yes, currently selling Twilly Series Touch Me [®]	Unable to say due to confidentiality policy	No complaints
12	Yes, in the past, not now, variety not given		Yes, stopped selling <i>P. obconica</i> due to problems with the public

decreased incidence of primula dermatitis might be expected (19).

Our study shows a statistically significant fall in the number of primin-positive patch tests over a 5-year period between 1995 and 2000, despite an overall increase in the number of patients being patch tested. This trend has continued in 2002, although the allergen is still being recorded.

There has been an overall increase in the sales of *P. obconica* Libre Series by UK seed suppliers and nurseries since Goldsmith began selling it 5–6 years ago, with up to 50% of seed suppliers now stocking it. Some seed suppliers stated that they have consciously stocked it due to a greater demand for primin-free plants, although 1 or 2 others refuted this by stating that they had not seen such a demand. However, we believe that the overall trend is moving towards primin-free varieties as even those suppliers who were not yet aware of these new varieties expressed a great interest in learning more about the primin-free plants, and another supplier is hoping to introduce the Twilly Series Touch Me[®] soon.

If the primin-free varieties prove to be horticulturally viable in the long term, it seems likely that primin will become a rare allergen in the future. Our study suggests that it is still a significant allergen at present, which justifies its retention in the standard series for the foreseeable future.

Acknowledgements

We thank all the dermatology departments who kindly completed and returned our questionnaires. We also thank Rosemary Greenwood, Statistician at Bristol Royal Infirmary, for her help and assistance with the statistics.

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