Allergic contact dermatitis from *Dittrichia viscosa* (L.) Greuter

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9 cases of contact sensitivity to *Dittrichia viscosa*, mainly with an airborne pattern, are described. All patients reacted to the fresh leaf of the plant and to its ethereal extracts at 1 and 0.5% pet., and some of them also to that at 0.1% pet. Positive reactions to *Frullania dilatata, Laurus nobilis*, some other members of the Compositae, and helenin were observed, suggesting the diagnosis of a sesquiterpene-lactone-induced allergic contact dermatitis.

*Key words:* allergic contact dermatitis; occupational; *Dittrichia viscosa; Inula viscosa; Frullania; Compositae; sesquiterpene lactones; plants; airborne contact dermatitis.

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*Dittrichia viscosa* (sticky elecampane) is an aromatic Mediterranean weed (Figs. 1, 2), occasionally used as a folk medicine (1). Widely scattered in Portugal, it grows along roads and tracks and in uncultivated fields. Its lanceolate leaves and stems are covered with fine glandular hairs: trichomes (2) (Figs. 3, 4).

The plant, a member of the Compositae family previously known as *Inula viscosa* Aiton (2), has occasionally been reported as a cause of allergic contact dermatitis (1, 3, 4). We report a study of 9 patients with contact sensitivity to this plant.
Material and Methods

Patients
9 patients (5 male and 4 female), between 41 and 82 years old (mean 55.5) were studied: 7 were rural workers, one a topographer and the other a hobby gardener (Table 1).

For periods varying between 3 months and 12 years, they reported outbreaks of acute airborne contact dermatitis. This was preceded by acute eczema at the sites of contact with the plants (Case nos. 1, 2 and 5) and lichenified lesions persisted at these sites in 2 patients (Case nos. 2 and 5). The 1st patient developed perioral eczema after using the stem of the plant as a toothpick. Dermatitis became generalized in the 3rd patient, with erythema-multiforme-like lesions on her trunk and arms.

Patch tests
Patients were patch tested with the fresh leaf of *D. viscosa* and its ethereal extracts (Hausen's (5) method) at 1, 0.5 and 0.1% pet. 1 patient was tested with fragments of trichomes of *D. viscosa* detached in our laboratory. Patients were also patch tested with *Frullania dilatata* as is, *Laurus nobilis* as is, several Compositae (ethereal extracts at 1% pet.), and the European standard series, perfumes, flavours and plants series from HeraChemie, West Germany.

50 controls being investigated for allergic contact dermatitis were patch tested with the ethereal extract at 1%, and 25 with the leaf as is.

Results
All our patients had a strong reaction to the fresh leaf, 3 of them with a bullous reaction and superficial necrosis. These patients also had an intense reaction to all concentrations of the extracts, including that at 0.1% (Fig. 5). 5 patients reacted to the extracts at 1% and

<table>
<thead>
<tr>
<th>Case no.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
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<td>sex</td>
<td>M</td>
<td>F</td>
<td>F</td>
<td>M</td>
<td>F</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>F</td>
</tr>
<tr>
<td>age</td>
<td>63</td>
<td>54</td>
<td>53</td>
<td>70</td>
<td>82</td>
<td>52</td>
<td>41</td>
<td>47</td>
<td>43</td>
</tr>
<tr>
<td>duration</td>
<td>3 years</td>
<td>6 years</td>
<td>3 months</td>
<td>12 years</td>
<td>2 years</td>
<td>2 years</td>
<td>1 year</td>
<td>5 months</td>
<td>6 years</td>
</tr>
<tr>
<td>primary site</td>
<td>perioral</td>
<td>forearms, airborne</td>
<td>airborne</td>
<td>airborne</td>
<td>legs, airborne</td>
<td>airborne</td>
<td>airborne</td>
<td>airborne</td>
<td></td>
</tr>
<tr>
<td>occupation</td>
<td>topographer</td>
<td>rural</td>
<td>rural</td>
<td>rural</td>
<td>rural</td>
<td>rural</td>
<td>rural</td>
<td>office worker</td>
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</tbody>
</table>
0.5%, but 3 failed to react at 0.1% (Table 2).

50 controls tested with the extracts at 1% were negative. Among 25 tested with the leaf as is, we found 2 positive results (+), with negative reactions to the extracts: 1 patient had an allergic contact dermatitis from *Frullania* and the other to perfumes (oak moss) and *Frullania*.

All of the 8 patients patch tested with *Frullania dilatata* had a positive test: 7 of 8 reacted to helenin. Other positive reactions are detailed in Table 2.

### Discussion

Contact sensitivity to *D. viscosa* was seen in 9 patients. 3 reported acute dermatitis of the hands, forearms and legs after coming into contact with weeds. This clinical pattern is observed in contact dermatitis from wild vegetation, especially with *Anthemis cotula* (6), though lichenified dermatitis, observed in 2 patients, is considered more common (7, 8). Spread of dermatitis to take up an airborne pattern is also a common feature of Compositae dermatitis (3, 7), as with *Parthenium hysterophorus* (5, 9). 1 patient had erythema-multiforme-like lesions, occasionally reported in allergic contact dermatitis from strong allergens of plants and woods (10) and terpenes (11).

The allergen of *D. viscosa* is contained in

### Table 2. Patch test results

<table>
<thead>
<tr>
<th>Patch tests</th>
<th>Case 1</th>
<th>Case 2</th>
<th>Case 3</th>
<th>Case 4</th>
<th>Case 5</th>
<th>Case 6</th>
<th>Case 7</th>
<th>Case 8</th>
<th>Case 9</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>D. viscosa</em> as is</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
</tr>
<tr>
<td><em>D. viscosa</em> 1%</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>NT</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
</tr>
<tr>
<td><em>D. viscosa</em> 0.5%</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>NT</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
</tr>
<tr>
<td><em>D. viscosa</em> 0.1%</td>
<td>++</td>
<td>+++</td>
<td>+++</td>
<td>++</td>
<td>NT</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
</tr>
<tr>
<td><em>E. dilatata</em></td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>+++</td>
<td>NT</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
</tr>
<tr>
<td><em>L. nobilis</em></td>
<td>NT</td>
<td>+++</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
</tr>
<tr>
<td><em>C. myconis</em></td>
<td></td>
<td>++</td>
<td>NT</td>
<td>++</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
</tr>
<tr>
<td><em>C. hortorum</em></td>
<td></td>
<td>++</td>
<td>NT</td>
<td>++</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
</tr>
<tr>
<td><em>Conyza bonariensis</em></td>
<td></td>
<td>++</td>
<td>NT</td>
<td>++</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
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</tr>
<tr>
<td><strong>Helenin 1%</strong></td>
<td></td>
<td>++</td>
<td>++</td>
<td>+</td>
<td>++</td>
<td>++</td>
<td>+++</td>
<td>NT</td>
<td>NT</td>
</tr>
<tr>
<td><strong>Arnica tinet.</strong></td>
<td></td>
<td>++</td>
<td>++</td>
<td>+</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
</tr>
<tr>
<td><strong>Laurel oil</strong></td>
<td><strong>NT</strong></td>
<td>+++</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
</tr>
<tr>
<td><strong>Pyrethrum</strong></td>
<td><strong>NT</strong></td>
<td>+++</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
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<tr>
<td><strong>B. Peru</strong></td>
<td><strong>NT</strong></td>
<td>+++</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
</tr>
<tr>
<td><strong>Colophony</strong></td>
<td>+++</td>
<td>+++</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
</tr>
<tr>
<td><strong>Perfume-mix</strong></td>
<td>+++</td>
<td>+++</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
<td>NT</td>
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<td>NT</td>
</tr>
</tbody>
</table>

1 This patient had a +++ patch test with the trichomes of *D. viscosa*.

2 *Chrysanthemum myconis* is now known as *Coleostephus myconis* Reichb. f. (synonyms *Chrysanthemum myconis* L. and *Myconia myconis* Briq.).

3 *Chrysanthemum hortorum* is probably *Dendranthema* cv. indet.

4 *Conyza bonariensis* (L.) Cronq.
the leaves and in its glandular trichomes, as has been demonstrated by Rodriguez et al. for Parthenium hysterophorus (5, 7), and by Hausen for Helianthus annuus (12). Also, 1 of our patients reacted to the trichomes of D. viscosa. They are easily detached from the plant: we collected fragments of them on a glass slide after whipping up the stems and leaves of the plant in our laboratory. The airborne pattern of dermatitis could therefore have arisen from contact with detached plant fragments carried on the wind.

The main allergens of D. viscosa are sesquiterpene lactones. In 1987, Piñedo et al. (1) isolated 3 fractions from its ethereal extracts; 2 of them gave a color reaction with a sesquiterpene lactone reagent and were positive when patch tested at 0.1% pet.

D. viscosa contains neither alantolactone nor isoalantolactone (1), the main sensitizing lactones of the genus Inula (1, 8). However, only 1 of our patients (Case no. 1) failed to react to helenin.

In 1977, Bohlmann et al. (13) isolated 2 different sesquiterpene lactones from D. viscosa, namely 2-deacetoxyxanthinillin and inuviscolide (Fig. 6), but neither human nor animal studies have been performed with them to confirm their sensitizing capacity.

We observed multiple positive reactions to sesquiterpene lactones with different structural skeletons, or to the plants in which they occur: (i) xanthanolide (2-deacetoxyxanthinillin) and (ii) guaianolide (inuviscolide), which we presume were present in our sample of D. viscosa (13); (iii) eudesmanolide as alantolactone and those usually isolated from Frullania (8); (iv) pseudoguaianolide as helenalin from Arnica tincture (8, 14), and (v) germacranelide as those from Laurus nobilis (laurenbolide and costunolide) (8, 15) and pyrethrum (pyrethrosin) (8). Studies conducted in man have shown multiple simultaneous positive reactions to sesquiterpene lactones with different structures (16, 17), but they occur more frequently within the same or similar groups (14, 16).

Positive patch tests to Frullania, Laurus nobilis and other Compositae, frequently reported (3, 8, 15, 18-23), are due to cross-reaction (15-16, 20, 21, 24, 25) and to multiple concomitant sensitization to different sesquiterpene lactones (17). This explains the frequent recurrences of allergic contact dermatitis induced by different plants containing sesquiterpene lactones (15, 19, 20, 26), as in our patients. Moreover, as they are widely scattered in Portugal: Frullania spp. (18), D. viscosa, Chrysanthemum myconis, Conyza bonariensis, etc., rural patients cannot avoid them all, and, for those who become highly sensitive, life in the countryside may become extremely difficult.

In 8 of our 9 cases, dermatitis from D. viscosa was occupational, as it frequently is in both Compositae and Frullania dermatitis (9, 14, 18).

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References
3. Pecegueiro M, Brandão F M. Airborne contact

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