

# Botanical Briefs: Liverworts—*Frullania* Species

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## Clinical Importance/ Cutaneous Manifestations

The *Frullania* species are liverworts that grow on rocks and bark of certain trees. These plants can cause allergic contact dermatitis in forestry workers, farmers, and those who frequent humid, heavily wooded areas.<sup>1,2</sup> Affected individuals commonly demonstrate eczematous lesions on exposed skin areas, often with an airborne pattern on the face and vee of the neck.<sup>3</sup> The distribution can mimic photodermatoses<sup>4,5</sup>; however, shaded areas such as the eyelids and nasolabial folds are typically involved,<sup>3</sup> while the submental area may be spared.<sup>1</sup> In wood handlers, the eruption often originates on the wrists and spreads proximally, eventually involving the face.<sup>6,7</sup> Optimal liverwort growth in wet winter months in the Pacific Northwest of the United States and increased recreational exposure during warm summer months in Europe cause seasonal flares.<sup>1,2</sup>

Occupational dermatitis generally requires exposure to the bark of affected trees. *Frullania* dermatitis is infrequent among workers such as sawyers, graders, and finishers who handle debarked trees.<sup>1,8</sup> People living far from wooded areas may be affected when using dry bark to heat their homes.<sup>4</sup> Occupational *Frullania* dermatitis also has been associated with fruit picking and tree pruning.<sup>9</sup>

Affected individuals generally respond rapidly to withdrawal from exposure. Sensitized forestry workers must change their occupation or alter job tasks to avoid exposure to bark. Topical or systemic

corticosteroids usually hasten recovery.<sup>8</sup> Bancons<sup>10</sup> was able to hyposensitize several *Frullania*-sensitive patients by using biweekly applications of whole *Frullania*. Storrs et al<sup>1</sup> successfully treated 2 patients with oral hyposensitization using mixtures of Compositae oleoresins.

## Family/Distribution of Plants

The plant division of Bryophyta is made of the Hepaticae class (liverworts) and the Musci class (mosses).<sup>11,12</sup> *Frullania* is a genus of liverworts in the plant family Jubulaceae and within the order Jungermanniales. There are roughly 5000 species of liverworts and nearly 800 species of *Frullania*.<sup>11,12</sup>

Liverworts are distributed worldwide, especially in damp, temperate, and subtropical forests, and can be found growing on rocks and tree bark, particularly from oak trees.<sup>3,11</sup> Despite the worldwide distribution of *Frullania*, reported cases of allergic contact dermatitis have been concentrated in the Pacific Northwest of the United States,<sup>1</sup> coastal British Columbia,<sup>7,13</sup> Spain,<sup>2,14</sup> France,<sup>4</sup> Portugal,<sup>9</sup> and England.<sup>15</sup> *Frullania dilatata* and *Frullania tamarisci* are frequent causes of contact dermatitis in Europe,<sup>4</sup> whereas *Frullania nisquallensis* is the common culprit in the Pacific Northwest and British Columbia.<sup>13</sup>

## Nomenclature

Liverwort is derived from the Old English word *liferwyr*t and are so named because the shape of the plant's leaves resembles the lobes of a liver.<sup>16</sup> *Frullania* dermatitis is also known as oak wood dermatitis, wood-cutter's eczema, cedar poisoning, and stroller's eczema.<sup>2</sup>

## Identifying Features/Plant Facts

Liverworts are small, mosslike, reddish or brownish plants with a compact ropelike appearance and regularly branching stems (Figure 1).<sup>1,3,8</sup> *Frullania* species have a stem with a median ventral row of clasping bilobed leaves or phyllidia.<sup>11</sup> Phyllidia are not true leaves due to the absence of veins.<sup>1</sup> Liverworts grow

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**Figure 1.** Liverworts with compact ropelike appearance and regularly branching stems. Photograph courtesy of Fran Storrs, MD.



**Figure 2.** Liverworts may persist on the bark of fallen trees. Photograph courtesy of Fran Storrs, MD.

well in warm moist environments, can withstand desiccation, and are known to persist on the bark of fallen trees (Figure 2).<sup>12</sup> Liverworts are not cultivated and have no apparent commercial value.<sup>17</sup>

### Allergens

At least 11 sensitizing species of *Frullania* have been identified.<sup>13</sup> Sesquiterpene lactones (SLs) are identified as the main allergens in liverworts. Frullanolide, an SL, has been identified as the main immunogenic agent in *Frullania*. A conjugated exocyclic carbon-carbon double bond on the lactone ring appears to be a requisite for sensitization.<sup>12-14</sup> Sensitization to

stereoisomers of frullanolide appear to be species specific,<sup>18,19</sup> thus individuals may be sensitive to only one of many *Frullania* species.<sup>2,4</sup> Therefore, in the workup of affected individuals, all local species of *Frullania* should be used when patch testing. Patch testing is performed by premoistening plant parts and applying them directly to the skin. Due to the high rates of sensitization from these procedures, patch testing with *Frullania* should be used only when the pretest probability of a positive reaction justifies the associated risk.<sup>4</sup>

SLs are also the main allergens in the Compositae, Lauraceae, and Magnoliaceae plant families.<sup>2,11,14,15</sup>

Patients with *Frullania* dermatitis will frequently demonstrate allergy to plants in these SL-containing families. Patch-test screening for *Frullania* allergy can be performed with the SL mix (0.1% in petrolatum), though false-negative reactions do occur.<sup>5</sup> Patients with a *Frullania* allergy will often demonstrate sensitivity to d-usnic acid, a lichen antigen, because lichens commonly grow in close proximity to liverworts. Sensitivity to lichens, however, is not a cross-reaction but rather a coreaction due to coexposure to both allergens.<sup>1</sup>

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