

## THE ABSORPTION OF NUTRIENTS IN THE PITCHERS OF THE SARRACENIACEÆ

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The technic used and the results obtained in this part of the research have been described in detail elsewhere.<sup>19</sup> They may be summarized briefly.

Study was made of:

1. The absorption of water from the pitcher cavity of *Darlingtonia californica*, *Sarracenia Sledgei*, *S. flava*, and *S. Drummondii*.
2. The absorption of nitrogenous compounds, such as ammonium chloride, ammonium tartrate, acetamide, urea, asparagin, glycocoll, trypsinized peptone, peptone, and egg albumin, from the pitcher cavity of *Sarracenia Sledgei*, *S. flava*, *S. Drummondii*, and *S. purpurea*.
3. The absorption of certain nitrogenous compounds (acetamide, urea, asparagin, and peptone) from the pitcher cavity of *Sarracenia purpurea* in the presence of a buffer phosphate solution. The buffer prevented escape of volatile nitrogenous compounds from the pitcher cavity in case they were produced prior to absorption.
4. The absorption of neutral phosphates from the pitcher cavity of *Sarracenia purpurea*.
5. The absorption of the lithium-ion from the pitcher cavity of *Sarracenia purpurea*, the tissues of which were shown spectroscopically to be free normally from the element lithium.

In each experiment with water, measurement was made of the volume of water introduced, and of the volume of the pitcher contents at the end of the experiment. In the experiments with nitrogenous compounds, either by themselves or in the presence of a buffer, and in the experiments with neutral phosphates, determination was made of the volume of solution and the mass of solute introduced, and also of the volume of the pitcher contents and the mass of solute present therein at the end of the experiment.

These studies led to the following general conclusions:

1. Water, which was introduced into the pitchers of *Darlingtonia californica* and the *Sarracenias*, underwent absorption.

2. When an aqueous solution of a nitrogenous compound was introduced into pitchers of the Sarraceniaceae, both the nitrogenous compound and the water were absorbed, but at a different rate; absorption of the nitrogenous compound was usually more rapid than that of the water.

3. When a phosphate buffer was added to the aqueous solution of the nitrogenous compound, the latter was absorbed while the pitcher contents increased in volume.

4. When a neutral phosphate solution was introduced into pitchers of *Sarracenia purpurea*, both the phosphate and the water were absorbed, but at a different rate; absorption of the phosphate was less rapid than that of the water.

5. The percent of the introduced nitrogenous compound or phosphate absorbed usually increased with the period of absorption.

6. When a solution of neutral lithium citrate was introduced into pitchers of *Sarracenia purpurea*, the lithium ion was absorbed.

7. Absorption by the pitchers of substances introduced into their cavities in solution has been demonstrated (a) by the decrease in the nitrogen or phosphate content of the solution, and (b) by appearance in the pitcher tissues of lithium, an element not normally present.

8. These results indicate that the proteolytic products, formed in the pitcher cavity by digestion of the prey, are absorbed by the pitchers and are utilized for the nutrition of the plant. They also indicate that phosphates, and probably other mineral foods, derived from the prey, are absorbed and utilized in like manner.

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