

## Germination of Avocado Seeds

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*In Botanical Gazette, vol. 28, p. 60.*

Another and very peculiar manner of germinating was observed in *Persea gratissima* Gartn., of which several seedlings were cultivated at the same time in the botanical garden at Washington, D. C. It is strange that the Lauraceae have been almost entirely passed by in works dealing with seedlings, none having been recorded either by Klebs (i.c) or Sir John Lubbock (i.c) Schacht appears to be the only author who has given us some information about them; he states that the seed of *Persea gratissima* germinates while the fruit is still attached to the tree. This author observed, also, that in this species of *Persea* the plumule attains a very early development with a number of leaves, similar to *Juglans* and *Tropaeolum*. Having detected a few other peculiarities connected with the germination of *Persea*, and having been unable to find any figure of this, I take this opportunity to publish and illustrate my observations.

"In *Persea gratissima* there is no endosperm, and the large cotyledons remain enclosed by the seed-coat. No hypocotyl develops during the germination, but the plumule grows out very soon as a shoot with several leaves, while the primary root at the same time has attained a considerable length and developed a number of very strong lateral roots arranged in whorls of from three to five or more. In the accompanying drawing (fig. 4) the plumule has developed as a single shoot, and it is very strange to notice that the very first four leaves, L1, are not only opposite, but even provided with petioles and blades, thus imitating the typical leaf of this species. On the other hand, the succeeding five or six leaves are almost scale-like, with no petiole or blade, but covered with silky hairs like the axis and the proper leaves when young. The *Persea gratissima* demonstrates the fact that in seedlings with enclosed cotyledons, there may be an alteration of various forms of leaves, while in *Juglans* and *Carya*, for instance, all the first leaves are scale or bristle-like.

"When, however, the plumule does not develop as a single shoot but as a complex of ramifications, the first leaves become almost suppressed and appear only as small and rather broad scales (fig. 5). In this case, the shoots have pushed out very freely from the axils of the lowest leaves, and have almost attained the same development as the plumule itself, possessing elongated internodes and some narrow scalelike leaves with silky hairs. Besides these lateral branches, there is a bud observable in the axil of each of the two cotyledons (fig. 6), which is evidently ready to develop if the mother-shoot, the plumule, should become injured. The first developed leaves were perfectly glabrous, in contrast to the succeeding ones. There were a few stomata on the lower surface but none on the upper. The mesophyll formed a homogeneous tissue filled with starch, and there was no indication either of collenchyma or stereome above or underneath the mestome bundles."