

SHORT COMMUNICATION

A CHEMICAL CONTRIBUTION TO THE TAXONOMIC STATUS OF *LOPHIOLA AMERICANA*

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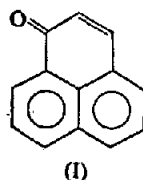
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Lophiola americana (Pursh) Wood (*L. aurea* Ker.) which grows in acid pine barren bogs from New Jersey to North Carolina, Florida and Mississippi, with a disjunct Nova Scotian segregate named *L. septentrionalis* Fern., is a plant of uncertain taxonomic status at the familial level. The plant has been referred by authorities either to Amaryllidaceae or to Haemodoraceae.¹ The only other representative of Haemodoraceae found north of lat. 30° N. is *Lachnanthes caroliniana* (Lam.) Dandy [*L. tinctoria* (Walt.) Ell.] which often grows in close association with *Lophiola americana*.

Many haemodoraceous genera are reported to have red-pigmented roots. Occurrence of red roots or tubers is recorded for *Haemodorum* (Australia), *Pyrrothiza* (South America), *Wachendorfia* (South Africa), and *Lachnanthes* (U.S.). In *Lachnanthes* the rhizomes and the core of the stolons are orange, while the outer layer of the stolons is pink to magenta.

On chemical investigation, the root pigments in seventeen species of the Australian genus *Haemodorum*,² as well as those of the monotypic American genus *Lachnanthes*,³ have been identified as derivatives of perinaphthenone (I). This aromatic ring-system has not been encountered elsewhere in phanerogams. *Lachnanthes* also contains related non-glycosidic perinaphthenones located in the brownish-red fleshy placentas supporting the seeds.



Lophiola roots and seed capsules lack visible pigmentation, in striking contrast to the bright red tubers of *Haemodorum* or the colorful stolons and rhizomes of *Lachnanthes*. Roots, golden-yellow flowers, and seed capsules of *Lophiola americana* have now been examined for pigments chemically related to those found in haemodoraceous species. Efforts to extract pigments with acetone or methanol as solvents, and separation by TLC have revealed no trace

¹ R. HEGNAUER, *Chemotaxonomie der Pflanzen*, Vol. 2, p. 228, Birkhäuser Verlag, Basel and Stuttgart (1963).

² R. G. COOKE and W. SEGAL, *Australian J. Chem.* (a) **8**, 107 (1955); (b) **8**, 413 (1955); (c) **11**, 230 (1958).

³ U. WEISS and J. M. EDWARDS, *Tetrahedron Letters* 4325 (1969).

of phenolic perinaphthenones in material collected at various times of the year. Chromatograms made from extracts of *Lophiola* flowers show several yellow to brown compounds; none of these gives the characteristic blue to purple reaction with alcoholic alkali or ammonia vapor, which permits the ready detection of perinaphthenones in the corresponding parts of *Lachnanthes*. The scarcity of *Lophiola* has so far precluded a detailed study of the chemistry of its yellow pigments.

Evidence being accumulated suggests that phenolic perinaphthenones may characterize members of the family Haemodoraceae. The absence of this chemotaxonomic character in *Lophiola* militates *against* inclusion of *Lophiola* in that family. The taxonomic validity and strength of phenolic perinaphthenones as a critical character in separation of Haemodoraceae from Amaryllidaceae and perhaps other families of higher plants must await search for these compounds in more genera than have been studied so far.