

## Phytogeographical Consideration on the Genus *Elaeocarpus* of the Volcano and Bonin Islands

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The Volcano Islands lie in the Pacific Ocean about 200 km southeast of the Bailey (Hahajima) group of the Bonin Island, between the Lat. 25° 25' and 24° 0' N. They consist of three islands, that is San Alessandro (Kita-iwoto), Sulphur Island (Naka-iwoto or merely Iwoto) and San Augustino (Minami-iwoto), from north to south. The Sulphur Island is a low, flat island raised above the sea level by the recent gradual elevation of the ocean bed, with a volcanic crater about 165 m in height above the sea. The San Alessandro and San Augustino are steep conical volcanoes about 768 and 930 m in height above the sea respectively, and the foot of them are further steepened by a severe marine erosion. Before the war, the population of the Sulphur Island was about 1000, and that of San Alessandro was about 100, while San Augustino was uninhabited.\* These volcanoes are considered by geologists to have been ejected in the Pleistocene, and the northern and southern islands are covered by dense original vegetation. On the other hand, the Bonin islands are believed to have originated in Eocene.

According to Dr. Merrill, the typical old world genus *Elaeocarpus* comprises about 400–450 recognized species, and the centre of its origin and development is believed to be Malaysia as a whole. The genus shows an attenuated distribution in the Pacific Ocean.

In the region in question, the genus is represented only by two endemic species, that is *E. photiniifolius* Hooker et Arnott in the Bonin group, and *E. pachycarpus* Koidzumi in the Volcano group. The two species, very different from each other, are growing there vigorously and ubiquitously, but separated into the two island groups which are not so far apart from each other. The following is the short diagnosis of the two species. *E. photiniifolius* is glabrous throughout except the very young bud, and the leaves are broadly oblanceolate, firm in texture, and the inflorescence is short with large flower rather few in number. The sepals 5.5–7 mm long, the petals 7.8–8.7 mm long\*\* and the anthers with several bristles in the apices. *E. pachycarpus* has the

\* The summit of the island was explored for the first time by a party consisting of Dr. Y. Horikawa, Dr. Y. Kobayasi and the author in 1936

\*\* All the data were taken from the dried specimens

young branches and petioles covered densely with minute adpressed hairs giving greyish colour to the surface, and the leaves are linearly oblanceolate, firm in texture, the inflorescence is rather long and the flower is small and numerous. The sepals 4.8–5.9 mm long, petals 6.5–7.3 mm long which are densely minute-pilose in the lower part inside, and the anthers are destitute of the apical bristles.

Dr. H. Hara recently published a paper concerning the Japanese *Elaeocarpus* and drew attention to the fact that the widely distributed Asiatic species, *E. sylvestris* (Loureiro) Poiret, are very variable in its floral characteristics, and the Japanese "Horuto-no-ki", formerly called by Japanese botanists *E. decipiens* Hemsley or *E. elliptica* (Thunberg) Nakai, is only a geographical variety of *E. sylvestris* occupying northern part of the distribution area of the species, and the variety is discriminated from the type by the larger flower with sepals 3.5–4.3 mm long, petals about 5–6 mm long, which is very sparsely pilose on inner side near the bases, and by the more numerous stamens i. e. 25–34 in number. *E. sylvestris* itself in the south China has smaller flowers with sepals 3.2–3.7 mm long, petals 3.5–4.5 mm long and densely pilose on the corresponding parts, and with less stamens which are generally 14–21 in number. Dr. Hara also mentioned that there occur some intermediate forms in the intermediate region like Formosa.

After the minute investigation of the taxonomic characters of *E. pachycarpus*, it was made clear that this has uniformity in the floral characters, for example the stamens are constantly 41–48 in number. This kind of uniformity is very natural in such a restricted and isolated area even in a taxonomic group very variable in other geographical conditions. In conclusion, *E. pachycarpus* has a close affinity with the Japanese form of *E. sylvestris* and some of the Formosan forms, in hairiness of the floral part, notwithstanding its much larger flowers, more numerous stamens and denser indumentum of the branchlets and petioles. On the contrary, *E. photiniifolius* was known to be a distinct and isolated species different from any other *Elaeocarpus* of the adjoining region.

Above stated situation of the genus *Elaeocarpus* in the Bonin and the Volcano groups symbolizes the phytogeographical status of the two island groups. In accordance with the geological history of the two groups, the flora of the Bonin groups shows higher rate of endemism than that of Volcano group. Confining the problem to the indigenous phanerogams, there are 158 endemic species out of 255 on the former group, and 43 out of 109 on the latter. On the Volcano group, there are 36 endemic species which is common to two groups, and the endemic species restricted to this group are only 7 in number.

Among the species which exist in the Volcano group and do not occur in the Bonin group, there are several examples which indicate

the strong phytogeographical affinity of the Volcano group with southern Japan, Formosa and south China. For example, *Maesa tenera* Mez, *Hibiscus mutabilis* L., *Crossostephium chinense* Makino, *Calanthe furcata* Bateman, and *Alpinia Nakaiana* Tuyama (ined.). The last mentioned species is endemic on the northern and southern islands, but it is closely related to *A. kelungensis* Hayata of northern Formosa. Among the ferns and fern allies, similar examples are *Asplenium rahaoense* Hayata, *Cornopteris fluvialis* Tagawa and *Lycopodium pinifolium* Blume.

It is a striking fact that in the flora of Volcano group, the Bonin elements find themselves in an attenuation, while several Japanese, Formosan and south Chinese elements make their appearance, jumping the distance of about 2000 km over the ocean.

#### Literature

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