

Distribution of *Salacca zalacca* 'Kelapa'

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Abstract

Salak or snake fruit (*Salacca zalacca*) is a kind of popular fruit originated from Sumatra and Java. There are many cultivars including both the wild and the hybrid ones. One of many cultivars namely *S. zalacca* 'Kelapa' was observed for its distribution. This cultivar is considered to be unusual because it has only a few spines on its petioles. This cultivar was previously found only in Karangasem Bali especially in the subdistrict of Sibatana, Selat, and Rendang and in Batujajar in West Java. A new record was found in Banjarnegara especially in Sokanandi Village. A map of the distribution of this cultivar is presented.

Key words : nonspined salak, *Salacca*, cultivar, distribution, phytogeography.

Introduction

The salak or snake fruit [*Salacca zalacca* (Gaertner) Voss] is a very popular fruit in Indonesia and its vicinity, it has been recognized since the prehistoric era. The taste of snake fruits is variable which may be astringent, sour, sweet, and their combinations. Snake fruits are very economical; they are easily marketed (Cahyono, 2016). Salak is a very important fruit product in Indonesia that has been cultivated throughout Indonesia and has been exported to several countries (Lestari *et al.* 2013). A lot of snake fruits from Sleman are exported to Singapore.

Salak is a fruit native to South Sumatra and Southwest Java and other parts of the world and belongs to the family Arecaceae. It is cultivated in many other regions as a fruit crop, and reportedly naturalized in Bali, Lombok, Timor, Malaysia, Maluku and Sulawesi (Govaerts & Dransfield, 2005). Another source stated that salak was native to Malaysia and Indonesia (Aralas *et al.* 2009).

The salak is morphologically and genetically variable. Even, the quality of its fruit may also change during maturation (Lestari *et al.* 2013). It has a high genetic diversity spread in almost every province in Indonesia. This variability is important for breeding program to produce better quality salak (Budiyanti *et al.* 2015). There are about 20 species of Salak in Sumatra, Java, Bali, and Kalimantan, three of them are edible, i.e. *Salacca zalacca*, *S. sumatrana*, and *S. affinis* (Schuling & Moge, 1992). In Indonesia, the salak has specific advantages compared with other fruits, namely it can be harvested 2-3 times a year when the management is good. Meanwhile, demand for fruits from other countries is quite high, which also never met, because in order to meet domestic consumption still lacking (Hadi *et al.*, 2002).

Amongst the edible snake fruits, there are a lot of cultivars such as pondoh madu, pondoh

kembangarum, pondoh sidaluhur, pondoh karangklesem, pondoh baturraden, local gading, local kedungparuk, local candinegara, local manonjaya, local kalisube, local condet, local banjarnegara etc. The snake fruits are manually easily hybridized by fertilizing the female inflorescence with the male, because the male inflorescences are different. A lot of hybridization has caused the snake fruits more and more variable. The result of a study on salak by Suskendriyati *et al.* (2000) showed that each cultivar was also variable.

A mutation may occur in some snake fruit resulting in distinct plant morphology, for example, the absence of spines on their petioles and other parts of plants. As the plants are mutants and not hybridized we name it as a variety, but in fact, it is in cultivation, so we name it by ICNCP and regard it as a cultivar (Brickell, *et al.* 2009).

Salacca zalacca 'Kelapa' is included in the local snake fruit. It is characterised with the relatively large sized, two seeded, and astringent taste. The presence of this cultivar is important for the source of genetic variability so that that plant breeders can use this cultivar for breeding purposes and conservation.

Materials and Methods

The materials of this research were snake fruit samples from many areas in Java. The study method was surveyed with purposive sampling, i.e. in Banyumas, Purbalingga, Banjarnegara, Kebumen, Sleman, Tasikmalaya, and Jakarta. The samples were observed for the morphology of their stem, leaves, and fruits. Tree habit, leaves, inflorescences, and fruits were photographed with a digital camera. Samples of leaves, inflorescences, and fruit were dried to make herbarium collections. Labels were made with data on their morphological characteristics such as size, color, and taste of fruits. The environmental data including geographic position

and altitude. Herbarium specimens were stored in Herbarium Fakultas Biologi Unsoed (PUNS) for future assessment and research.

Result

There are three groups of *Salacca zalacca* namely salak lokal, salak pondoh and *S. zalacca* 'Kelapa'. The third group is regarded as distinct because it has only a few spines or almost non spined snake fruit. The description of the last snake fruit is presented as follows.

Salacca zalacca 'Kelapa'

Synonym *Salacca zalacca* 'Pondoh Non Duri' Annisaurrohmah & Herawati

Type: Widodo 850, Annisaurrohmah 002, Sokanandi Banjarnegara (PUNS)

Short-stemmed tree, basal rosette, 3-6 m tall, ca 5 cm lower diameter, ca 10 cm upper diameter, trunk cylindrical, greyish green, canopy 5-7 m wide. It produces clumps of 2-3 plants. Leaves with petioles which are dark green; the leaves are pinnately compounded with leaflets 45-53 cm long, 3-4.5 cm wide, arranged decussate or semi opposite; leaflet base truncate, apices acuminate; upper surface glossy green to dark green, lower surface greyish green. Inflorescence axillary especially in the lower axis. Male flowers cylindrical like sausage 5 – 15 cm long, yellowish pink; female inflorescence shortly cylindrical to globose; flowers pink. Fruits elliptic, ovate, to globose with fruit base acuminate, 4-5 cm long, 2.45-3.50 cm in diameter; endocarps yellowish white, each tree produces 5-7 inflorescences; with ca 40 fruits per inflorescence; fruit color dark brown, fruit taste astringent during young and sweet at maturity; weight 38-45 g per fruit. Seeds glossy white, with three seeds per fruit.

Table 1. Comparison of *Salacca zalacca* 'Kelapa', salak lokal and salak pondoh

Characteristics	<i>Salacca zalacca</i> 'Kelapa'	<i>Salacca zalacca</i> 'Lokal'	<i>Salacca zalacca</i> 'Pondoh'
Habit	Solitary or clumped with 2-3 seedlings	Clumped with 2-10 seedlings	Clumped with 2-10 seedlings
Spines	Rare, caducous	Many, non caducous	Many, non caducous
Inflorescence	Female	Male and female	Female
Fruit taste	Astringent, sour, sweet	Astringent, sweet	Sour, sweet



Figure 1. *Salacca zalacca* 'Kelapa' (above), *S. zalacca* 'Zalacca' common snake fruit (below)



Figure 2. *Salacca zalacca* 'Kelapa' (a) habit, (b) petiole, (c) seedling, (d) fruit on leaf lower surface.
Photo: Widodo

Distribution

Salacca zalacca 'Kelapa' was originated from Bali and called as salak Jaka which was cultivated by selecting salak kelapa seedling as the parent. Previously, salak kelapa was only cultivated in Sibetan Village, Subdistrict Bebandem, Karangasem Regency, then they were developed in Selat and Rendang Subdistrict in 1970. The presence of salak kelapa was a result of natural gene mutation, on which the salak lost their spines upto 50%. In addition, the length of the spines decrease. It is also reported

that Salak kelapa are also planted in Batujajar West Java (Rukmana,1999). A new distribution area of *S. zalacca* 'Kelapa' is in the village of Sokanandi Banjarnegara Central Java (Figure 3). The presence of this salak was unknown.

The vertical distribution showed that snake fruit kelapa can grow well on soft soils from the lowlands to a height of 700 m above sea level. Production will reduce if planted lower than 300 m above sea level. The low height limit of altitude is 900 m above sea level, if the altitude is above 900 m, then the salak will be difficult to produce fruit (KTNA Bali, 2014).



Figure 3. Distribution map of *Salacca zalacca* 'Kelapa' in Batujajar West Java, Banjarnegara Central Java, and Karangasem Bali.

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References

- Annisaurrohmah, Herawati W, & Widodo P. 2014. Keanekaragaman Kultivar Salak Pondoh di Banjarnegara. *Biosfera* 31(2): 71-83.
- Aralas S, Mohamed M, & Bakar M.F.A. 2009. "Antioxidant properties of selected salak (*Salacca zalacca*) varieties in Sabah, Malaysia". *Nutrition & Food Science* 39 (3): pp.243-250.
- Brickell, C.D. *et al.* (eds). 2009. "International Code of Nomenclature for Cultivated Plants" (PDF). *Scripta Horticulturae* (8th ed.). International Society of Horticultural Science. 10: 1–184.
- Budiyanti T, Hadiati S, Prihatini R, & Sobir. 2015. Genetic Diversity of Indonesia Snake Fruits as Food Diversification Resources. *International Journal of Advanced Science Engineering Information Technology*. 5 (3): pp. 192-195.
- Cahyono, B. 2016. Panen Untung dari Budidaya Salak Intensif. Lily Publisher. Yogyakarta.
- Govaerts, R. & Dransfield, J. 2005. World Checklist of Palms: 1-223. The Board of Trustees of the Royal Botanic Gardens, Kew.

- Hadi, P.S., Purwantoro, & Prajitno D. 2002. Identifikasi kromosom dalam penentuan jenis kelamin salak (*Salacca zalacca*). *Agrosains* 15(1):31-46.
- KTNA Bali. 2014. Salak Bali Tanpa Duri. Bali Agrobag. <http://www.baliagrobag.com/index.php/78-artikel/74-salak-tanpa-duri>. Accessed 28 October 2017.
- Lestari R, Ebert G, & Huyskens-Keil S. 2013. Fruit Quality Changes of Salak "Pondoh" Fruits (*Salacca zalacca* (Gaertn.) Voss) during Maturation and Ripening. *Journal of Food Research* 2(1): pp. 204-216.
- Rukmana R. 1999. Salak. Prospek Agribisnis dan Teknik Usaha Tani. Kanisius. Yogyakarta.
- Schulling, D.J. & Mogeia, J.P. 1992. *Salacca zalacca* (Gaertner).Voss. In Coconet, R.E. & Vesheij, E.W.M (Eds): Plant Resources of South-East Asia, No 2; Edible fruits and nuts. *Prosea Foundation*. Bogor. Indonesia. pp 281 – 284.
- Suskendriyati H, Wijayati A, Hidayah N, & Cahyuningdari D. 2000. Studi Morfologi dan Hubungan Kekerabatan Varietas Salak Pondoh (*Salacca zalacca* (Gaert.) Voss.) di Dataran Tinggi Sleman. *Biodiversitas* 1(2): pp 59-64.