

# Spatial distribution

*by* Sundari Su

---

|                |   |                 |       |
|----------------|---|-----------------|-------|
| FILE           | OPULATION_CHARACTERISTICS_OF_LOCAL_DURIAN_DURIO_SPP._SC<br>OPUS.PDF (1.73M) |                 |       |
| TIME SUBMITTED | 24-AUG-2020 10:57AM (UTC+0700)  | WORD COUNT      | 2373  |
| SUBMISSION ID  | 1373225420  | CHARACTER COUNT | 11939 |

3

## Spatial distribution and population characteristics of local durian (*Durio* spp.) in West Halmahera Island

Sundari, and Nuraini Sirajudin

2

Citation: *AIP Conference Proceedings* **2021**, 080013 (2018); doi: 10.1063/1.5062832

View online: <https://doi.org/10.1063/1.5062832>

View Table of Contents: <http://aip.scitation.org/toc/apc/2021/1>

Published by the American Institute of Physics

---

---

**AIP** | Conference Proceedings

Get **30% off** all  
print proceedings!

Enter Promotion Code **PDF30** at checkout



# Spatial Distribution and Population Characteristics of Local Durian (*Durio* spp.) in West Halmahera Island

Sundari<sup>1,a)</sup> and Nuraini Sirajudin<sup>1)</sup>

<sup>1)</sup>Departement Biology of Education, Faculty of Teacher Training and Education, Khairun University, Ternate North Maluku, Indonesia

<sup>a)</sup>Corresponding author: [sundariunkhair08@gmail.com](mailto:sundariunkhair08@gmail.com)

**Abstract.** West Halmahera Island is one of the centers of durian production in North Maluku. The objective of this research is to make distribution maps of the population and characteristics of the local durian in West Halmahera Island. The research was conducted from April to June 2015, using the descriptive method with purposive sampling. The methods include mapping of local durian use recorded in terms of GPS coordinates. The population and characteristics of the fruit plants were observed using the plant morphology and associated vitality and periodicity. Data analysis was performed by processing the coordinate data and observational data for the population and characteristics of fruit plants through the application of a GIS base map. The spatial distribution of local durian in West Halmahera is found along the lowlands (21–139 m asl), with a grouping pattern. The condition of fruit plants grow well in a state of sprouting, flowering and fruiting

**Keywords:** characteristics, local durian, production, spatial distribution.

## INTRODUCTION

Halmahera Island is one of the islands with the largest land area in North Maluku. Halmahera Island has a microclimate condition with a relatively high air temperature, about 27°C with a maximum temperature of 31°C and a minimum temperature of 20°C. During 2013–2015 the largest number of rainy days fell in July, with 23 days with a rainfall of 478 mm.<sup>1</sup> Durian grows well in wet tropical regions with rainfall > 2,000 mm / year and is spread evenly throughout the year with 9–10 wet months / year and 1–2 dry months before flowering. Light intensity 40%–50%, with temperatures 22°C–30°C. The altitude of a good place between 100–500 m above sea level, planting in a higher area will degrade its quality.<sup>2</sup>

West Halmahera Regency, in particular Jailolo, is one of durian production centers in North Maluku. In harvest season, the durian is very abundant and the selling price is relatively cheap. In Jailolo there are many names for local durian fruit. The local name is not based on scientific agreement, but based on the owner's name, the growing address, and the morphological character of the fruit. The giving of local names also uses the ethnic language in North Maluku. Local Jailolo durian is the most fruitful durian throughout the year.<sup>3</sup>

Research on a dispersion map and on the characteristics of the durian plant population in West Halmahera Island, especially Jailolo, has not been very extensive, so the research presented here was done to construct a database and understanding of the agronomic characteristics of the durian fruit planted by local people. This study aims to construct a map of the distribution of the local durian and its characteristics in Jailolo, West Halmahera Island. Such a distribution map of the durian plants has the potential to increase the public perception of the sustainability of local resource management as one of the steps for conservation and breeding the local durian fruit of Jailolo.

## EXPERIMENTAL DETAILS

Surveying and mapping the local durian crops was carried out by recording the coordinate points using GPS for each durian crop in each village as hotspots on West Halmahera Island (Jailolo). The map targeted plants including durian plants owned by the community and fruit used by the community. Determination of the characteristics of the local durian population was done by observing plant morphology related to vitality and periodicity, which refers to the Braun–Blanquet method, adapted to the plantation crop condition. Data analysis was done by processing coordinate data and observation data of fruit plant population characteristics into a base map employing the ArcGIS application.

5

## RESULTS AND DISCUSSION

Based on the results of exploration of the local durian in the Jailolo district of West Halmahera at the location of the study, there were found 37 local names for durian variants (*Durio* spp.) from Jailolo, as shown in Table 1.

**TABLE 1.** The local name of durian and distribution in West Halmahera Island (Jailolo)

| No    | Location    | Local name      | Code | Altitude (m asl) |
|-------|-------------|-----------------|------|------------------|
| 1     | Worat-worat | Malal           | J1   | 84               |
|       |             | Yang            | J2   | 88               |
|       |             | Lole            | J3   | 84               |
|       |             | Serkaya         | J4   | 86               |
| 2     | Tibobo      | Buro-buro       | J5   | 83               |
|       |             | Boga            | J6   | 88               |
|       |             | Nanas           | J7   | 90               |
|       |             | Pisang          | J8   | 72               |
|       |             | Amo             | J9   | 121              |
|       |             | Nene            | J10  | 110              |
| 3     | Balisoang   | Namo-namo/ayam  | J11  | 53               |
|       |             | Sahbadar        | J12  | 54               |
|       |             | Nicodimus       | J13  | 42               |
|       |             | Batu            | J14  | 41               |
|       |             | Tabesang/wu'dus | J15  | 49               |
|       |             | Kudu            | J16  | 49               |
|       |             | Soroa           | J17  | 56               |
|       |             | Kopi            | J18  | 57               |
|       |             | Gajah           | J19  | 53               |
|       |             | Mentega         | J20  | 59               |
| 4     | Gamsungi    | Ping            | J21  | 139              |
|       |             | Pelesku         | J22  | 130              |
| 5     | Golo        | Kopi            | J23  | 27               |
|       |             | Gajah           | J24  | 21               |
|       |             | Manggis         | J25  | 32               |
|       |             | Chano           | J26  | 28               |
|       |             | Mentega         | J27  | 42               |
| 6     | Aketola     | Gumala          | J28  | 41               |
|       |             | Bebe            | J29  | 36               |
|       |             | Tete            | J30  | 34               |
|       |             | Papan           | J31  | 28               |
|       |             | Lametiko        | J32  | 31               |
|       |             | Sambiki         | J33  | 31               |
|       |             | Tobu            | J34  | 29               |
|       |             | Goiom           | J35  | 33               |
| Pare  | J36         | 29              |      |                  |
| Gajah | J37         | 25              |      |                  |

source: Data from field Survey, 2015

The result of coordinates of local durian distribution in West Halmahera Island especially in the Jailolo subdistrict (Fig. 1)

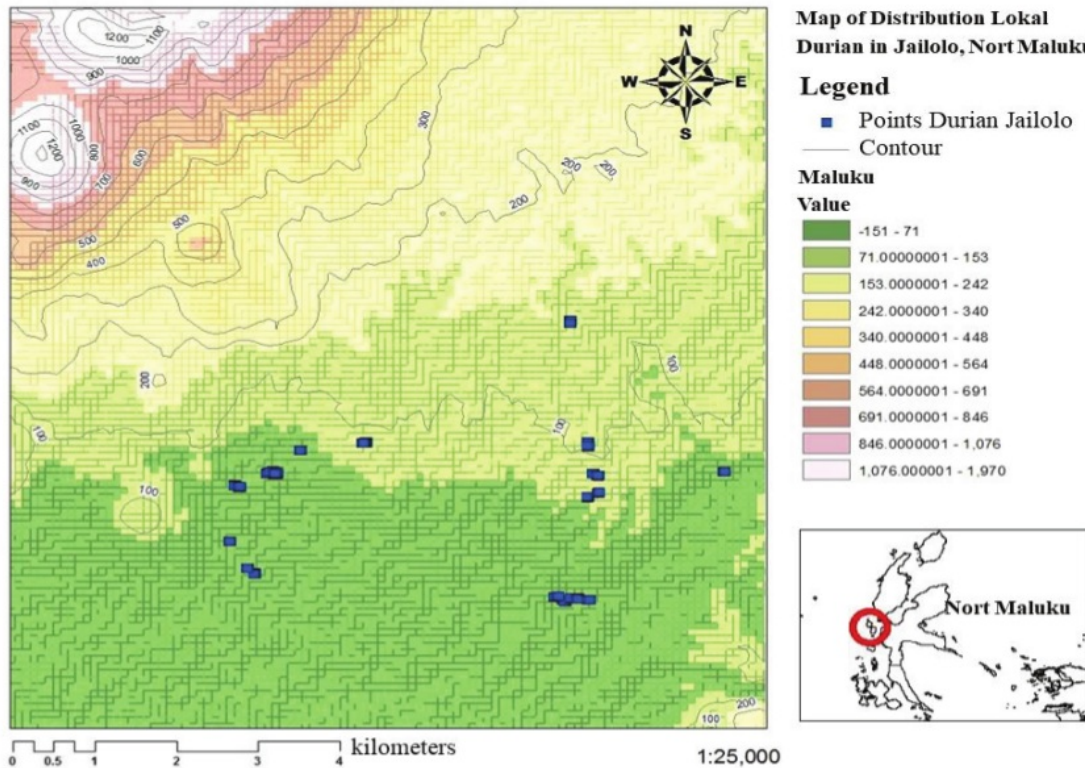


FIGURE 1. Local Durian Distribution Map in Jailolo, North Maluku.

Durian plants were found in six locations in the Jailolo subdistrict. This plant grows in the yards of a fairly large population with various plant habits: tree/wood. The woody plants are more durable and have many benefits, including having a wide canopy that can be used as shade, and a dried twig that can be used as firewood. Arobaya and Pattiselanno state that the woody species is widely used for fencing and firewood by rural community groups.<sup>4</sup>

Based on the observations of the targeted durian plants, it has been determined that the plant is spread in groups in the durian garden hotspot of the community in Jailolo. The distribution pattern of the local Jailolo durian plants is depicted in a distribution map based on the recording of coordinate points of the locations of the durian plants found in the community yard (Fig. 1). In the villages of Balisoang and Aketola, the coordinate points are dense because more and more species of durian plants need to be thoroughly observed in their genetic diversity, whereas in the villages of Worat and Golo, there is relatively little diversity and only small numbers. The number of fruit plants found in each village is different. According to Rukmana, in the countryside, the yard is not only a source of **7** income for society, but also the basis of the household economy.<sup>5</sup> The development of fruit trees in the yard has an **important role in increasing the options of farmers, improving the community's nutrition, and developing home industry (agroindustry).** The successful intensification of the utilization of the yard will support activities on other farms. The strategy of developing local durian plants in the yard can be done with a selection of superior durian fruit, which can be used as a superior durian icon in Jailolo.

The characteristics of the plant population of durian, based on vitality found from six observed hotspots, varies, basically because vitality is a continuous growth of the plant which need continuous observation, but in this research the observation was done in a certain period where it can represent the development of the plant as a whole and the observation was made morphologically on the fruit plant with tree habitus. In general, the vitality value of fruit

plants based on the results of the average, resulted in vitalities in the vitality classifications of 1 and 2, which means growing well with sprouts or not sprouting. This is because at the time of the study period, plants were entering the stages of flowering and fruiting.

According to the owners of the durian trees, the flowering period and fruitful periods has been rather variable since 2013 due to climatic conditions. In general, the durian in Jailolo bear fruit almost simultaneously in July until October, but there have also been fruit in May. This vitality data may be seen in Table 2.

**TABLE 2.** Percentage of vitality of local durian Jailolo Plant (*Durio* spp.) at 6 locations

| No | Location  | % Vitalitas                 |                                 |                                 |                                     |
|----|-----------|-----------------------------|---------------------------------|---------------------------------|-------------------------------------|
|    |           | Grow Good and Sprout (vit1) | Grow Good and not Sprout (vit2) | Grow not Good and Sprout (vit3) | Grow not Good and not Sprout (vit4) |
| 1  | Worat     | 100                         | 0                               | 0                               | 0                                   |
| 2  | Tibobo    | 97                          | 3                               | 0                               | 0                                   |
| 3  | Balisoang | 100                         | 0                               | 0                               | 0                                   |
| 4  | Gamsungi  | 98                          | 2                               | 0                               | 0                                   |
| 5  | Golo      | 100                         | 0                               | 0                               | 0                                   |
| 6  | Aketola   | 96                          | 4                               | 0                               | 0                                   |

The characteristic of population periodicity is a rhythmic condition in plant life. This is shown by the presence of flowers and fruit, which is a sign that the plant is reproducing. When the study took place, in July–September 2015, it was a period of flowering and fruiting (harvest), but at that time not all durian plants in the six villages were simultaneously bearing fruit. There were some kelurahan that should have enter their fruit season, because in April, durian flowering plants had fallen due to rain. The rhythmic period of the flowering of the durian plants in Jailolo is from August to the harvest period of October–November, and the second flowering period is December for the harvest period of February–March. The time required for the development of interest in this study from initiation to flowering is 6–7 weeks. This is in accordance with the French statement that the durian flowering from initiation to anthesis takes approximately 6–8 weeks. Bloom or anthesis is the opening stage of the flower when the parts of the flower are ready for pollination. From the results note that the blooming time of each variety occurs in the afternoon until night and falls out at the end of the night until the morning. This is according to Lim (1997) and Ashari (2004), who reported that the anthesis of flowers occurred at 15.30 to 18.00 and fell at night.<sup>6,7</sup> This periodicity data may be found in Table 3.

**TABLE 3.** Percentage periodicity of Local Durian Jailolo (*Durio* spp.) at 6 locations

| No | Location  | % Periodicity          |           |          |                              |
|----|-----------|------------------------|-----------|----------|------------------------------|
|    |           | Flowering and fruitful | Flowering | Fruitful | No Flowering and no fruitful |
| 1  | Worat     | 50                     | 50        | 0        | 0                            |
| 2  | Tibobo    | 60                     | 40        | 0        | 0                            |
| 3  | Balisoang | 40                     | 60        | 0        | 0                            |
| 4  | Gamsungi  | 50                     | 50        | 0        | 0                            |
| 5  | Golo      | 50                     | 50        | 0        | 0                            |
| 6  | Aketola   | 50                     | 50        | 0        | 0                            |

(Observations from June until September, 2015)

In the durian harvest season in Jailolo in 2015 there was a shift in the rhythm of the periodicity. This was due to unclear seasonal changes (according to interviews with community owners of durian). Variations of flowering and fruiting seasons of durian plants are normal. The presence of this variation is due to the genetic differences of each type, which allow differences in plant response to the temperature of the growing environment. Calvo *et al.* reported that there was a difference in the period of growth stage in loquat plants between the varieties of Cardona and the San Filipparo variety due to temperature.<sup>8</sup> Development of fruits at low temperatures slows the development of fruit to maturity of the fruit. Durian flowers are perfect flowers, which have stamen and pistils and have other flower arrangement compartments. The floral organs of each variety have differences, among others in the number of stamen and floral aromas. This shows there are differences in flower characteristics of each variety. Yacobb, says

that flower and fruit forms can be used for the identification of varieties.<sup>9</sup> The result of measurement of environmental factors is presented in Fig. 2.

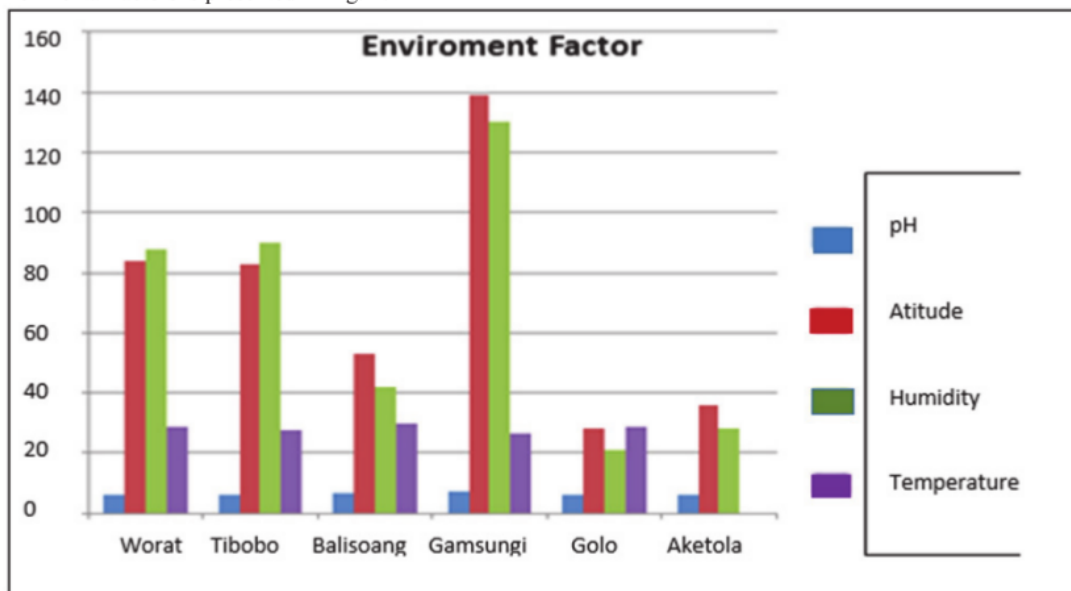


FIGURE 2. Enviroment factor of local durian Distribution in Jailolo North Maluku.

The spatial distribution of the local durian in Jailolo is spread along the lowlands (21–139 m asl), with a clustering pattern. The environmental factor that most contributes to variations in the local durian in Jailolo is the temperature: because Jailolo is part of the Halmahera Island, it has a variation of microclimate yielding a different temperature at each location.

## SUMMARY

The distribution of the local durian in West Halmahera Island (Jailolo) is spread over six locations as hotspots. In Jailolo there are 37 local names for varieties of durian. An analysis of the characteristics of the population and its vitality and periods was carried out in terms of the various states, including growing well, sprouted, flowering, and fruiting. At the time of observation there had been a shift in the periodicity rhythm caused by local climate change and transition.

## ACKNOWLEDGEMENTS

The authors would like to thank Ismat Ishak for assisting the data collection in the field and Abdu Mas'ud for assisted in the data analysis for mapping used ArcGIS.

## REFERENCES

1. Meteorological, Climatological and Geophysical Agency (BMKG), *North Maluku Climate Database* (Office of BMKG of North Maluku Province, Ternate, 2014).
2. Deputy Office of the Ministry of Research and Technology for Science and Utilization of Science, *Knowledge and Technology, Agricultural Cultivation of Durian* (Bombaceae sp) (The Ministry of Research and Technology for Science and Utilization of Science, Jakarta, 2000).
3. Statistics Indonesia, *Ternate in Figures* (Statistics Indonesia (BPS) of North Maluku, Ternate, 2015).
4. A. Y. S. Arobaya and F. Pattiselanno, *Biota* **12**, 192-195 (2007).
5. R. Rukmana, *Bertanam Buah-Buahan di Pekarangan* (Kanisius Publisher, Yogyakarta, 2008).

6. T. K. Lim and L. Luders, *Ann. Appl. Biol.* **132**, 151-165 (1997).
7. S. Ashari, *Biologi Reproduksi Tanaman Buah-Buahan Komersial* (Bayumedia Publishing, Malang, 2004), pp. 85-88.
8. J. Martinez-Calvo, M. L. Badenes, H. Bleiholder, H. Hack, G. Llacer and U. Meier, *Ann. Appl. Biol.* **134**, 353-357 (2008)
9. O. Yaacob and S. Subhadrabandhu, *The Production of Economic Fruits in South-East Asia* (Oxford University Press, New York, 1995) pp. 90-97.



# Spatial distribution

---

## ORIGINALITY REPORT

---

% **12**  
SIMILARITY INDEX

% **12**  
INTERNET SOURCES

%  
PUBLICATIONS

%  
STUDENT PAPERS

---

## PRIMARY SOURCES

---

**1** [www.scribd.com](http://www.scribd.com) Internet Source %**6**

---

**2** [mafiadoc.com](http://mafiadoc.com) Internet Source %**2**

---

**3** [sinta3.ristekdikti.go.id](http://sinta3.ristekdikti.go.id) Internet Source %**1**

---

**4** [nhapho24h.vn](http://nhapho24h.vn) Internet Source %**1**

---

**5** [www.asian-efl-journal.com](http://www.asian-efl-journal.com) Internet Source %**1**

---

**6** [www.whereandwhen.net](http://www.whereandwhen.net) Internet Source <%**1**

---

**7** [edepot.wur.nl](http://edepot.wur.nl) Internet Source <%**1**

---

EXCLUDE QUOTES OFF

EXCLUDE OFF

EXCLUDE MATCHES OFF

## BIBLIOGRAPHY