Distribution and Population of Mentilin (Cephalopachus bancanus bancanus) in Bangka Regency [Current Research Journal of...

Article · March 2017

DOI: 10.19026/crjbs.9.3421

CITATIONS
0

READS
32

3 authors:

Randi Syafutra
Bangka Belitung University
4 PUBLICATIONS **0** CITATIONS
SEE PROFILE

Hadi Sukadi Alikodra
Bogor Agricultural University
25 PUBLICATIONS **19** CITATIONS
SEE PROFILE

Entang Iskandar
Bogor Agricultural University
47 PUBLICATIONS **71** CITATIONS
SEE PROFILE

Current Research Journal of Biological Sciences 9(1): 9-15, 2017
DOI:10.19026/crjbs.9.3421
ISSN: 2041-076X, e-ISSN: 2041-0778

Submitted: July 20, 2016 Accepted: August 23, 2016 Published: March 20, 2017

Research Article

Distribution and Population of Mentilin (*Cephalopachus bancanus bancanus*) in Bangka Regency

[1]Randi Syafutra, [2]Hadi Sukadi Alikodra and [3]Entang Iskandar
[1]Department of Primatology, Multidisciplinary Program, Bogor Agricultural University, Bogor, West Java 16151, Indonesia
[2]Department of Forest Resources Conservation and Ecotourism, Faculty of Forestry, Bogor Agricultural University, Bogor, West Java 16680, Indonesia
[3]Primate Research Center, Bogor Agricultural University, Bogor, West Java 16151, Indonesia

Abstract: Mentilin (*Cephalopachus bancanus bancanus*) is a flagship species of Bangka Island and considered as an endangered subspecies. It is a nocturnal primate with big and round red eyes. This research aimed to identify distribution and population of mentilin in Bangka Regency by using line transect method. The research was conducted at rubber (*Hevea brasiliensis*) agroforest in four villages (i.e., Zed, Kemuja, Paya Benua and Petaling) in Bangka Regency, Bangka Belitung Islands Province, Indonesia, from January 2016 to May 2016. In total of four observed-line transects with each length of ±2 km showed that the highest distribution of mentilin was obtained in mentilin habitat in Petaling Village and the lowest distribution of mentilin was obtained in mentilin habitat in Zed Village. The distribution of mentilin was affected by distance of mentilin habitat to settlement and shrub. The population density of mentilin was 2.22-17.78 individuals/km^2. The population estimate of mentilin in the village of Zed, Kemuja, Paya Benua and Petaling was 90 individuals, 296 individuals, 348 individuals and 1,078 individuals.

Keywords: Bangka regency, *Cephalopachus bancanus bancanus*, distribution, population, rubber agroforest

INTRODUCTION

Tarsier (the name for *Tarsiidae* member) is a nocturnal primate with ability to jump vertically and have appearance like a little monkey with big and round red eyes (Amnur, 2010). Tarsiers live and breed in various habitat types, such as primary forest, secondary forest, dense bamboo grove, mangrove forest, plantation near forest and shrub (Napier and Napier, 1968; Fogden, 1974; Niemitz, 1979; MacKinnon and MacKinnon, 1980; Wolfheim, 1983; Supriatna and Wahyono, 2000; Wright *et al*., 2003; Macdonald, 2006). *Tarsiidae* has three genera, those are *Cephalopachus* (western tarsier), *Carlito* (Philippine tarsier) and *Tarsius* (eastern tarsier) (Groves and Shekelle, 2010). *Cephalopachus* has only one species, that is *C. bancanus* with its four subspecies (i.e., *C. b. bancanus*, *C. b. saltator*, *C. b. natunensis* and *C. b. borneanus*) (Yustian, 2007; IUCN, 2008). *C. b. bancanus* has local name on Bangka Island called mentilin.

IUCN (International Union for the Conservation of Nature and Natural Resources) (2008) has determined the conservation status of *C. bancanus* as vulnerable (VU) species (IUCN, 2008; Roos *et al*., 2014). However, its subspecies conservation status has various levels, those are *C. b. borneanus* as VU subspecies, *C. b. bancanus* and *C. b. saltator* as endangered (EN) subspecies and *C. b. natunensis* as critically endangered (CR) subspecies (Roos *et al*., 2014). In addition, Indonesia Government has protected *C. bancanus* and its subspecies through the Government Regulation No. 7 of 1999 about the Preservation of Plants and Animals. Determination of *C. bancanus* conservation status is certainly based on *C. bancanus* depopulation, which is caused by its habitat loss. The loss of *C. bancanus* habitat is caused by forest conversion for unconventional tin mining area, large scale oil palm plantation area, settlement, illegal logging, fires and floods. Besides, the depopulation of *C. bancanus* is also caused by illegal hunting and trading (IUCN, 2008; Yustian *et al*., 2009).

The population density data of *C. bancanus* as western tarsier is still limited compared with eastern tarsier. Population density of *C. b. borneanus* was less than 80 individuals/km^2 in Serawak (Niemitz, 1979, 1984) and about 14-20 individuals/km^2 in Sabah (Crompton and Andau, 1986, 1987), while population

Corresponding Author: Randi Syafutra, Department of Primatology, Multidisciplinary Program, Bogor Agricultural University, Bogor, West Java 16151, Indonesia

Table 1: Description of mentilin habitat in each research location

Research location	Description of mentilin habitat	Altitude (m asl)	Slope (%)
Zed	Abandoned rubber agroforest aged over 10 years	22-40	0-7.6
Kemuja	Abandoned rubber agroforest aged over 10 years + forest of giant atter bamboo (*Gigantochloa atter*)	24-39	0-7.0
Paya Benua	Abandoned rubber agroforest aged over 10 years	22-46	0-7.7
Petaling	Abandoned rubber agroforest aged over 10 years + abandoned and unproductive plantation of pepper (*Piper nigrum*)	22-32	0-7.7

density of *C. b. saltator* was about 19-46 individuals/km^2 on Belitung Island (Yustian, 2007; Yustian *et al*., 2009). Furthermore, population density of *C. b. bancanus* in Muara Enim, South Sumatra was about 25 individuals/km^2 in the forest area of PT. Suryabumi Agrolanggeng and 8 individuals/km^2 in the local rubber plantation (Sesa *et al*., 2014). Besides, the population density research of *C. bancanus* has never been conducted on Bangka Island (*C. b. bancanus*) and in Serasan and Subi, Natuna Islands (*C. b. natunensis*), which are proved by undiscovered population density publication of *C. bancanus* in those areas. Based on those statements, the research of "Distribution and Population of Mentilin (*Cephalopachus bancanus bancanus*) in Bangka Regency" was important to be conducted. This research aimed to identify distribution and population of mentilin in Bangka Regency.

METHODOLOGY

Time and research locations: This research was conducted at rubber (*Hevea brasiliensis*) agroforest in four villages (i.e., Zed, Kemuja, Paya Benua and Petaling) in Bangka Regency, Bangka Belitung Islands Province, Indonesia (Table 1). Overall, those villages have a total area of about 224.56 km^2 or 22,456 ha. A preliminary survey was conducted from April 2014 to July 2014 (4 months), while the research was conducted from January 2016 to May 2016 (5 months). Besides, the research was conducted on clear or cloudy sky condition and not conducted on rainy condition.

Material and equipments: Animal used as research material was mentilin (*Cephalopachus bancanus bancanus*), while equipments used during the research included: a altimeter, a digital camera, a GPS receiver (*Garmin eTrex* 30), a handlamp, a headlamp, a map (Google Earth Pro7.1.5.1557), observation sheets and stationery.

Method of data collection: The method used in order to obtain distribution and population data of mentilin was line transect (Fig. 1 and 2). Each research location has a line transect with a length of 2 km and a visibility of 25 m on both sides of line. The visibility was obtained from the preliminary survey. Observation of mentilin in each research location was conducted in three periods of time (i.e., 15:00-18:00, 20:00-24:00 and 01:00-05:00) and repeated three times on period of new moon and full moon, so repetition of mentilin observation in each research location was 18 times. The identified mentilin was counted based on its physical appearance number.

Distance of mentilin habitat to the nearest settlement and shrub were measured to determine its influence to mentilin distribution. Identification of the distance was conducted digitally. Each research location was recorded its coordinate point by using *Garmin eTrex*30 and mapped in *Google Earth Pro* 7.1.5.1557 to measure its distance to the nearest settlement and shrub.

Data analysis: Population density of mentilin in each research location was determined by analyzing obtained data with a formula (SCNP, 1981) as written below:

$$D = \frac{N}{l \, x \, w}$$

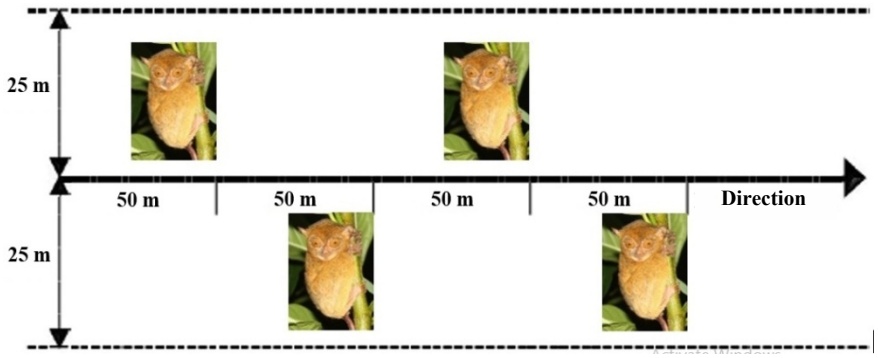

Fig. 1: Design of line transect

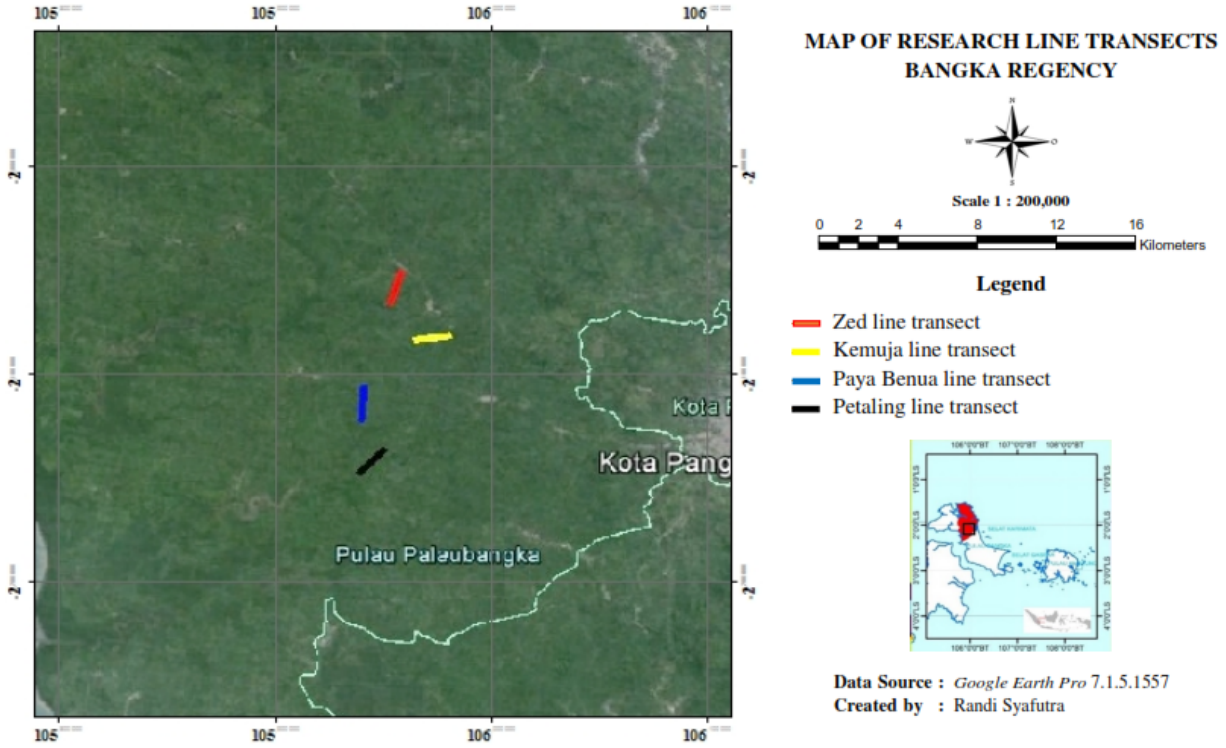

Fig. 2: Line transect in each research location

D was population density of mentilin (individual/km^2); N was number of the identified mentilin (individual); *l* was total length of observation track in each research location (km), (*l* = 36 km = 2 km ×3 repetitions of observation ×3 periods of time ×2 periods of moon); and *w* was width of observation track in each research location (50 m or 0.05 km).

Population estimate of mentilin in each research location was determined by analyzing obtained data with a formula (SCNP, 1981) as written below:

$$P = D \times A$$

where,

P = Population estimate of mentilin (individual)
D = Population density of mentilin (individual/km^2)
A = Area estimate of rubber agroforest as the representative habitat for mentilin (km^2).

RESULTS AND DISCUSSION

Mentilin in all research locations was identified always solitary and never be identified in groups. This fact is in accordance with the statement of Groves and Shekelle (2010) that *C. bancanus* was a species that does not have social groups in wild and does not tolerate social groups in captivity.

Mentilin distribution: Based on field observations, mentilin was found in all research locations, but with varied distribution. Distribution of mentilin is presented in Table 2 and Fig. 3.

Based on Table 2 and Fig. 3, habitat with the lowest distribution of mentilin was Zed, while habitat with the highest distribution of mentilin was Petaling. Table 2 also showed that distribution of mentilin was in lowland with altitude range below 50 m asl. This fact is in accordance with the statement of Wirdateti (2005) that western tarsier (*C. bancanus*) was commonly found in lowland with altitude range below 150 m asl. Variation of mentilin distribution is most likely influenced by several factors as presented in Table 3.

Based on Table 3, distance of mentilin habitat to settlement and shrub had a major influence on mentilin distribution. The farther distance of mentilin habitat to settlement and the nearer distance of mentilin habitat to shrub, the higher distribution of mentilin in its habitat. Identification of mentilin habitat distance to settlement is important to be done, because it is based on the statement of Winarti (2011) that the nearer distance of wild animal habitat to settlement, the higher possibility for the wild animal to be hunted and caught. Meanwhile, identification of mentilin habitat distance to shrub is also important to be done. It is based on the statement of Fogden (1974) that shrub was one of mentilin favorite areas. The shrub became a favorite area for mentilin because it provided convenience for mentilin to obtain insects as food in the area, especially insects of Lepidoptera (moths) and Orthoptera (crickets and grasshoppers).

Table 2: Distribution of mentilin

Location of mentilin habitat	Maximal number of the identified mentilin	Location coordinate of the identified mentilin	Location altitude of the identified mentilin*) (m asl)
Zed	1	002°03'38.99"S 105°57'19.29"E	31
Kemuja	2	002°05'01.80"S 105°58'17.46"E	31
		002°05'03.90"S 105°58'03.59"E	33
Paya Benua	5	002°06'30.67"S 105°56'26.90"E	46
		002°06'36.85"S 105°56'26.41"E	45
		002°06'53.74"S 105°56'25.20"E	36
		002°06'59.16"S 105°56'24.74"E	34
		002°07'04.10"S 105°56'24.12"E	36
Petaling	7	002°08'18.14"S 105°56'57.50"E	25
		002°08'20.79"S 105°56'54.71"E	24
		002°08'23.84"S 105°56'51.66"E	25
		002°08'27.49"S 105°56'48.34"E	27
		002°08'37.25"S 105°56'37.83"E	28
		002°08'45.92"S 105°56'29.16"E	22
		002°08'54.49"S 105°56'20.72"E	30

*) analysis of *Google Earth Pro* 7.1.5.1557

Table 3: Distance of mentilin habitat to the nearest settlement and shrub

Location of mentilin habitat	Maximal number of the identified mentilin	Distance of mentilin habitat to the nearest settlement*) (km)	Distance of mentilin habitat to the nearest shrub*) (km)
Zed	1	1.16	7.11
Kemuja	2	1.37	4.99
Paya Benua	5	2.38	0.72
Petaling	7	5.43	0.36

*) analysis of *Google Earth Pro* 7.1.5.1557

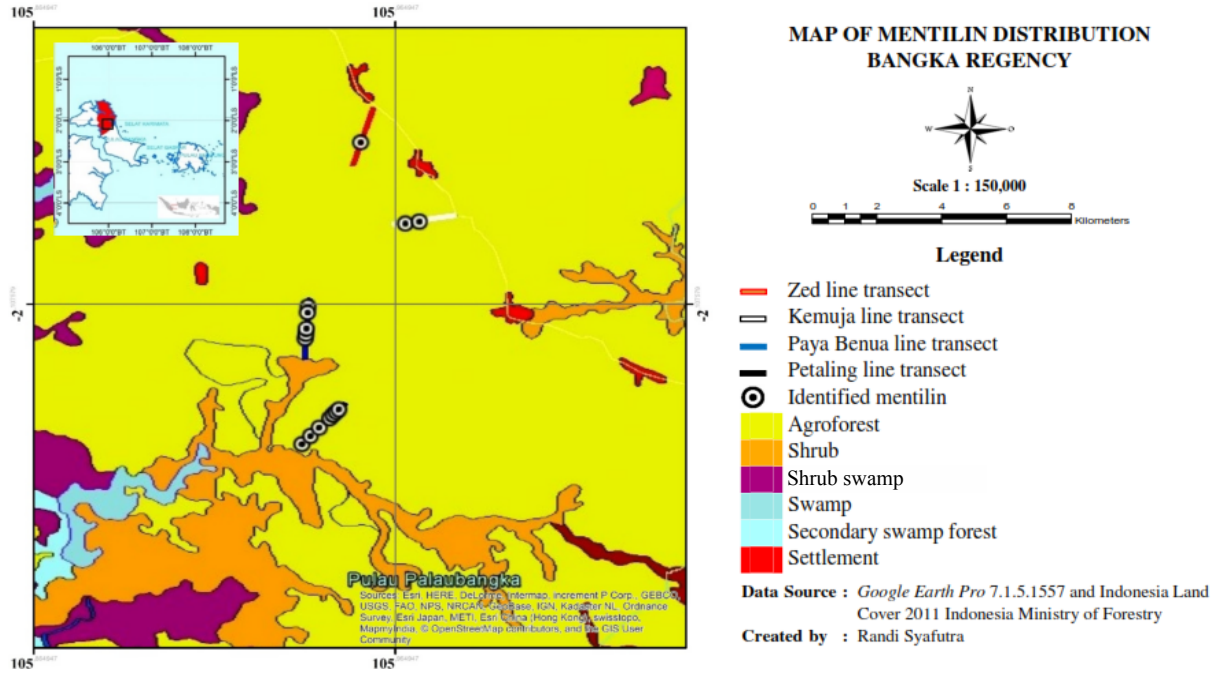

Fig. 3: Distribution of mentilin in four habitats

Population density of mentilin: Based on data analysis, population density of mentilin was 2.22-17.78 individuals/km^2. The population density of mentilin is lower than the population density of *C. b. borneanus* on Borneo (<80 individuals/km^2) (Niemitz, 1979, 1984) and *C. b. saltator* on Belitung Island (<46 individuals/km^2) (Yustian, 2007; Yustian *et al*., 2009). If population density of mentilin is converted based on period of moon, then population density of mentilin on new moon was 4.44-27.78 individuals/km^2 and on full moon was 0-7.78 individuals/km^2. Population density of mentilin is presented in Fig. 4.

Based on Fig. 4, population density of mentilin on full moon was fewer than new moon. It is most likely caused by mentilin on full moon was more active and easier to see the arrival of observers than new moon, so it can immediately avoid the eyesight of observers. This fact is in accordance with the information from the

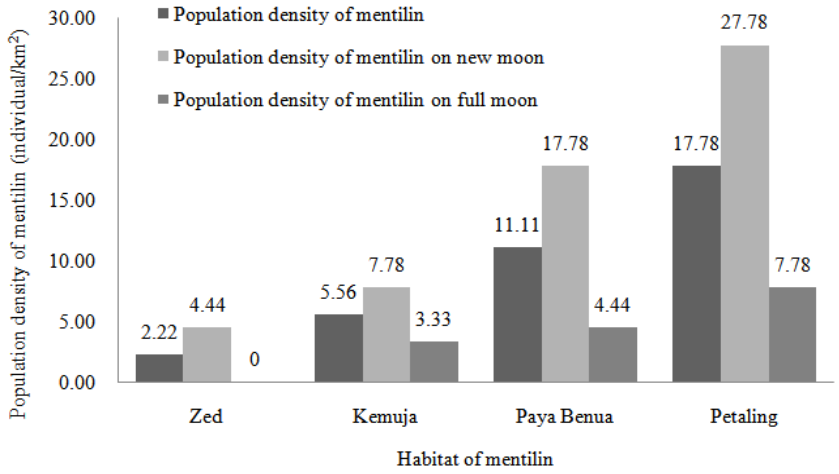

Fig. 4: Population density of mentilin

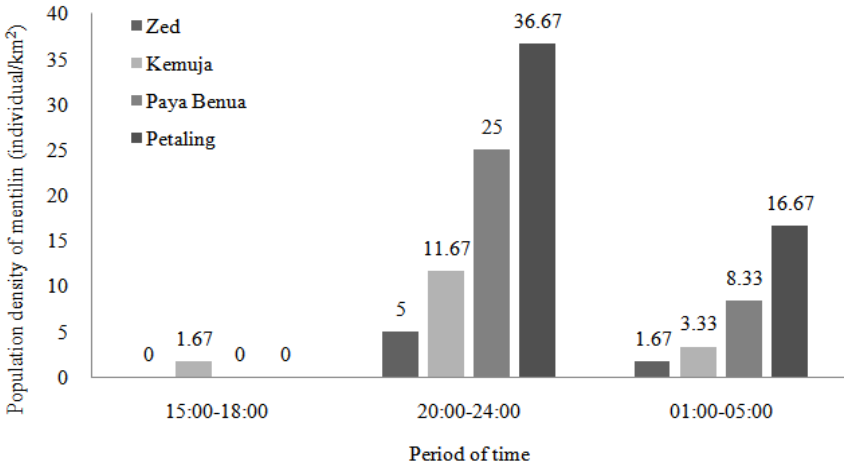

Fig. 5: Population density of mentilin based on period of time

community around the research locations (especially animal hunters) that mentilin was easier to be caught on new moon. Mentilin became easier to be caught on new moon because its eyes did not have *tapetum lucidum*, but have *fovea centralis*. *Tapetum lucidum* is generally owned by nocturnal animals that has a function to increase the light received by eyes, so the nocturnal animals can see in the darkness. Meanwhile, *fovea centralis* is generally owned by diurnal animals that has a function to provide high visual acuity on eyes. These facts show that mentilin always needs moonlight in its daily activities, although it is the nocturnal animal.

Cachel (2015) stated that tarsiers were not primarily nocturnal animals, but secondarily nocturnal animals. Tarsiers became secondarily nocturnal animals because it did not have *tapetum lucidum* and has *fovea centralis*, so it was indicated evolve from a diurnal ancestor. Besides, Gursky (2007) stated that *Tarsius spectrum* on Sulawesi Island was more active on full moon than new moon (lunarphilia). *T. spectrum* became a lunarphilic was caused by three factors, those are food availability, foraging efficiency and predator avoidance. Population density of mentilin based on period of time is presented in Fig. 5.

Based on Fig. 5, mentilin was more identified at 20:00-24:00 than at 01:00-05:00 and 15:00-18:00. It is most likely caused by mentilin actively search for food and move at that time. Meanwhile at 01:00-05:00, mentilin has finished search for food and preferred to rest and hide in order to avoid predators. At 15:00-18:00, mentilin was generally still in a state of sleeping and hiding, so it was fewer identified at the time. Based on direct observation in Petaling, mentilin began to wake up and move before *maghrib* time (around 18:00) and returned to the vegetation of sleeping in the morning (around 06:15). The observation result is in accordance with the statement of Helma (2013) that *T. spectrum* on Sulawesi Island left the nest around 18:00 and returned to the nest around 06:00-07:00.

Population estimate of mentilin: The population estimate of mentilin was multiplication result between population density of mentilin and area estimate of rubber agroforest as the representative habitat for

Table 4: Population estimate of mentilin

Research location	Area estimate of rubber agroforest as the representative habitat for mentilin*) (km^2)	Population density of mentilin (individual/km^2)	Population estimate of mentilin (individual)
Zed	40.56	2.22	90
Kemuja	53.15	5.56	296
Paya Benua	31.29	11.11	348
Petaling	60.62	17.78	1,078

*) Indonesia land cover 2011 Indonesia Ministry of Forestry

mentilin. Based on data analysis, population estimate of mentilin in the village of Zed, Kemuja, Paya Benua and Petaling was 90 individuals, 296 individuals, 348 individuals and 1,078 individuals. Population estimate of mentilin is presented in Table 4.

CONCLUSION

The highest distribution of mentilin was obtained in mentilin habitat in Petaling Village and the lowest distribution of mentilin was obtained in mentilin habitat in Zed Village. The farther distance of mentilin habitat to settlement and the nearer distance of mentilin habitat to shrub, the higher distribution of mentilin in its habitat. The population density of mentilin was 2.22-17.78 individuals/km^2. The population estimate of mentilin in the village of Zed, Kemuja, Paya Benua and Petaling was 90 individuals, 296 individuals, 348 individuals and 1,078 individuals.

ACKNOWLEDGMENT

We would like to thank all people involved in the research, especially to the Community of ALOBI (Animal Lover of Bangka Island) and F2B (Flora Fauna Bangka), Dr.rer.nat. Indra Yustian from Sriwijaya University and Dr. Eddy Nurtjahya from Bangka Belitung University. The research has received permission from the Goverment of Bangka Belitung Islands Province and Bangka Regency. The research is a part of first author research project entitled "Habitat Characteristic and Population Estimate of Mentilin (*Cephalopachus bancanus bancanus*) in Bangka Island, Indonesia". The research project has funded by Rufford Small Grants for Nature Conservation that can be visited in http://www.rufford.org/projects/randi_syafutra.

Conflict of interest: The published journal article from the research will be a requirement for first author to complete his master degree in primatology, Bogor Agricultural University. Besides, co-authors (second author and third author) are supervisors of first author or corresponding author.

REFERENCES

Amnur, N.A., 2010. Characteristics of habitat preference of *Tarsius tarsier* in Bantimurung Bulusaraung National Park, Maros, South Sulawesi. M.Sc. Thesis, Bogor Agricultural University, Bogor.

Cachel, S., 2015. Fossil Primates. Cambridge University Press, Cambridge.

Crompton, R.H. and P.M. Andau, 1986. Locomotion and habitat utilization in free-ranging *Tarsius bancanus*: A preliminary report. Primates, 27(3): 337-355.

Crompton, R.H. and P.M. Andau, 1987. Ranging, activity rhythms, and sociality in free-ranging *Tarsius bancanus*: A preliminary report. Int. J. Primatol., 8(1): 43-71.

Fogden, M.P.L., 1974. A Preliminary Field Study of the Western Tarsier *Tarsius bancanus* Horsfield. In: Martin, R.D., G.A. Doyle and A.C. Walker (Eds.), Prosimian Biology. Duckworth, London, pp: 151-165.

Groves, C. and M. Shekelle, 2010. The genera and species of *Tarsiidae*. Int. J. Primatol., 31(6): 1071-1082.

Gursky, S.L., 2007. Primate Field Studies: The Spectral Tarsier. Pearson Education, New Jersey.

Helma, 2013. Habitat description of *Tarsius spectrum* in Tangale Nature Reserve. M.Sc. Thesis, Gorontalo State University, Gorontalo.

IUCN (International Union for the Conservation of Nature and Natural Resources), 2008. *Tarsius bancanus* (Horsfield's *Tarsier*, Horsfield's *Tarsier*, *Western Tarsier*). Retrieved from: http://www.iucnredlist.org/details/21488/0. (Accessed on: March 1, 2015)

Macdonald, D.W., 2006. The Encyclopedia of Mammals. Oxford University Press, Oxford.

MacKinnon, J. and K. MacKinnon, 1980. The behavior of wild spectral tarsiers. Int. J. Primatol., 1(4): 361-379.

Napier, J.R. and P.H. Napier, 1968. A Handbook of Living Primates Morphology, Ecology and Behaviour of Nonhuman Primates. Academic Press, London.

Niemitz, C., 1979. Outline of the Behavior of *Tarsius bancanus*. In: Doyle, G.A. and R.D. Martin (Eds.), the Study of Prosimian Behavior. Academic Press, New York.

Niemitz, C., 1984. Biology of Tarsiers. G. Fischer, Stuttgart, New York.

Roos, C., R. Boonratana, J. Supriatna, J. Fellowes, C. Groves, S. Nash, A.B. Rylands and R.A. Mittermeier, 2014. An updated taxonomy and conservation status review of Asian primates. Asian Primates J., 4(1): 2-38.

SCNP, 1981. Techniques for the Study of Primate Population Ecology. National Academy Press, Washington D.C.

Sesa, A., I. Yustian and Z.P. Negara, 2014. Population estimate and habitat of *Tarsius bancanus bancanus* in Sumatera. J. Penelit. Sains, 17(1): 14-19.

Supriatna, J. and E.H. Wahyono, 2000. Field Guide of Indonesia Primates. Yayasan Obor Indonesia, Jakarta.

Winarti, I., 2011. Habitat, population, and distribution of Javan Slow Loris (*Nycticebus javanicus* Geoffroy 1812) at Talun in Tasikmalaya and Ciamis, West Java. M.Sc. Thesis, Bogor Agricultural University, Bogor.

Wirdateti, 2005. Feeding and habitat of tarsier (*Tarsius bancanus*) and slow loris (*Nycticebus coucang*) in pasir panjang forest at pangkalan bun, Central Kalimantan. J. Biol. Indones., 3(9): 360-370.

Wolfheim, J.H., 1983. Primates of the World: Distribution, Abundance and Conservation. University of Washington Press, Seattle.

Wright, P.C., E.L. Simons and S.L. Gursky, 2003. Tarsiers: Past, Present, and Future. Rutgers Series in Human Evolution, Rutgers University Press, New Brunswick, N.J.

Yustian, I., 2007. Ecology and conservation status of *Tarsius bancanus saltator* on Belitung Island, Indonesia. Ph.D. Thesis, Göttingen University, Cuvillier Verlag, Göttingen.

Yustian, I., S. Merker and M. Muehlenberg, 2009. Home ranges and estimate of population density of *Tarsius bancanus saltator* on Belitung Island. J. Biol. Indones., 5(4): 411-421.