Suci Dian Hayati, Ibnul Qayim, Rika Raffiudin, and Miftahudin Miftahudin. 2023. Variety of plants and nest site preference: Traditional knowledge of *sunggau* for attracting *Apis dorsata* in Indonesia. Ecosphere.

**Appendix S1. Table S1.** Profile of respondents in study area

| **Profile of Respondents** | | **Number** | **Percentage** |
| --- | --- | --- | --- |
| **Origin of Respondents** | |  |  |
| Perpat | | 5 | 42 |
| Tanjung Rusa | | 4 | 33 |
| Kembiri | | 3 | 25 |
| Total of Respondent | | 12 | 100 |
| **Number of Respondent** | |  |  |
| Perpat | a. Key informants | 2 | 17 |
| b. Respondents | 3 |
| Tanjung Rusa | a. Key informants | 1 | 8 |
| b. Respondents | 3 |
| Kembiri | a. Key informants | 2 | 17 |
| b. Respondents | 1 |
| **Age** | |  |  |
| 34-40 years | | 4 | 33.3 |
| 41-50 years | | 4 | 33.3 |
| >50 years | | 4 | 33.3 |
| **Gender** | |  |  |
| Male | | 12 | 100 |
| **Religion** | |  |  |
| Islam | | 12 | 100 |
| **Language** | |  |  |
| Belitung malay | | 12 | 100 |
| **Education** | |  |  |
| Did not pass Elementary School | | 2 | 17 |
| Elementary School | | 4 | 33 |
| Junior High School | | 3 | 25 |
| Senior High School | | 2 | 17 |
| Bachelor | | 1 | 8 |
| **Main Job** | |  |  |
| Farmer | | 11 | 92 |
| Fisher | | 1 | 8 |
| **Age commence to learn *sunggau*** | |  |  |
| 5 years | | 3 | 25 |
| > 5 years | | 9 | 75 |
| **Age to build the first *sunggau*** | |  |  |
| 8 – 14 years | | 10 | 83 |
| > 15 years | | 2 | 17 |
| **Source of *sunggau* information** | |  |  |
| Family member | | 9 | 75 |
| Other bee farmer | | 1 | 8 |
| Both of family member and another bee farmer | | 2 | 17 |
| **Collecting honey independently** | |  |  |
| Yes | | 9 | 75 |
| Assisted by another collector | | 2 | 17 |
| Sometimes | | 1 | 8 |

**Table S2**. Questions used for semi-structured interviews with bee farmersin three study area

| **No** | **Questions 1-4: *sunggau*, 5-8: plant diversity, 9-11: ethnobotany** |
| --- | --- |
|  | When did you learn and who taught you to construct *sunggau*? |
|  | Is there any specific location where you build them? |
|  | How do you choose the location to build *sunggau*? |
|  | What kind of *sunggau* do you build? |
|  | What plant species do you use and prefer to construct *sunggau*? |
|  | Where are those plants found? |
|  | What are the criteria for choosing the plants to build *sunggau*? |
|  | Are those plants still abundant? |
|  | Are there any *sunggau* rituals, and who participated? |
|  | Are there any prohibitions when building *sunggau*? |
|  | Are those plants used for other purposes by local people? |
|  | What are the challenges when it comes to building *sunggau* nowadays? |

**Table S3**. Various of site locations, types, and species used as main plank of *sunggau* found in three study area.

| **Code** | **Ecosystem zones** | **Sunggau types** | **Family** | **Scientific name** | **Local name** |
| --- | --- | --- | --- | --- | --- |
| **KEMBIRI** | | | | | |
| KMB\_9 | MG | *Tunggak Muke* | Myrtaceae | Syzygium urceolatum | *Samak* |
| KMB\_10 | MG | *Ungad* | Combretaceae | *Lumnitzera littorea* | *Teruntum* |
| KMB\_20 | OD | *Bantaian* | Clusiaceae | *Garcinia bancana* | *Melak* |
| KMB\_15 | OD | *Tunggak muke* | Aquifoliaceae | *Ilex cymosa* | *Mensirak* |
| KMB\_6 | OD | *Ungad* | Hypericaceae | *Cratoxylum glaucum* | *Gerunggang* |
| KMB\_5 | OD | *Ungad* | Anacardiaceae | *Buchanania arborescens* | *Pao* |
| KMB\_4 | OD | *Ungad* | Phyllanthaceae | *Aporosa frutescens* | *Pelangas* |
| KMB\_14 | OD | *Ungad* | Phyllanthaceae | *Aporosa frutescens* | *Pelangas* |
| KMB\_2 | RP | *Tunggak Muke* | Lauraceae | *Cryptocarya densiflora* | *Medang* |
| KMB\_1 | PO | *Tunggak Muke* | Phyllanthaceae | *Aporosa frutescens* | *Pelangas* |
| KMB\_3 | PO | *Ungad* | Lauraceae | *Cryptocarya densiflora* | *Medang* |
| KMB\_8 | SH | *Bantaian* | Hypericaceae | *Cratoxylum glaucum* | *Gerunggang* |
| KMB\_17 | SH | *Bantaian* | Myrtaceae | *Syzygium palembanicum* | *Melukan* |
| KMB\_13 | SH | *Tunggak Muke* | Lauraceae | *Cryptocarya densiflora* | *Medang* |
| KMB\_7 | SH | *Ungad* | Hypericaceae | *Cratoxylum glaucum* | *Gerunggang* |
| KMB\_18 | SH | *Ungad* | Hypericaceae | *Cratoxylum glaucum* | *Gerunggang* |
| KMB\_19 | SH | *Ungad* | Calophyllaceae | *Calophyllum soulattri* | *Malong* |
| KMB\_12 | SH | *Ungad* | Lauraceae | *Cryptocarya densiflora* | *Medang* |
| KMB\_16 | SH | *Ungad* | Mytaceae | *Syzygium palembanicum* | *Melukan* |
| KMB\_11 | SW | *Tunggak Muke* | Myrtaceae | Syzygium urceolatum | *Samak* |
| **PERPAT** | | | | | |
| PP\_47 | MG | *Bantaian* | Podocarpaceae | *Podocarpus neriifoliius* | *Punyuk* |
| PP\_57 | MG | *Bantaian* | Podocarpaceae | *Podocarpus neriifoliius* | *Punyuk* |
| PP\_58 | MG | *Bantaian* | Combretaceae | Lumnitzera sp. | *Teruntum* |
| PP\_46 | MG | *Tunggak Muke* | Calophyllaceae | Calophyllum sp. | *Betor* |
| PP\_52 | MG | *Tunggak Muke* | Calophyllaceae | Calophyllum sp. | *Betor* |
| PP\_59 | MG | *Tunggak Muke* | Hypericaceae | *Cratoxylum glaucum* | *Gerunggang* |
| PP\_51 | MG | *Tunggak Muke* | Lauraceae | *Cryptocarya densiflora* | *Medang* |
| PP\_45 | MG | *Tunggak Muke* | Podocarpaceae | *Podocarpus neriifoliius* | *Punyok* |
| PP\_50 | MG | *Tunggak Muke* | Myrtaceae | Syzygium urceolatum | *Samak* |
| PP\_56 | MG | *tunggak muke* | Combretaceae | Lumnitzera sp. | *teruntum* |
| PP\_44 | MG | *Ungad* | Myrtaceae | *Melaleuca cajuputi* | *Gelam* |
| PP\_43 | MG | *Ungad* | Podocarpaceae | *Podocarpus neriifoliius* | *Punyok* |
| PP\_48 | MG | *Ungad* | Podocarpaceae | *Podocarpus neriifoliius* | *Punyok* |
| PP\_49 | MG | *Ungad* | Podocarpaceae | *Podocarpus neriifoliius* | *Punyok* |
| PP\_6 | OD | *tunggak muke* | Calophyllaceae | Calophyllum sp. | *Betor* |
| PP\_9 | OD | *tunggak muke* | Calophyllaceae | Calophyllum sp. | *Betor* |
| PP\_10 | OD | *tunggak muke* | Calophyllaceae | Calophyllum sp. | *Betor* |
| PP\_11 | OD | *tunggak muke* | Calophyllaceae | Calophyllum sp. | *Betor* |
| PP\_14 | OD | *tunggak muke* | Calophyllaceae | Calophyllum sp. | *betor* |
| PP\_26 | OD | *tunggak muke* | Calophyllaceae | Calophyllum sp. | *Betor* |
| PP\_27 | OD | *tunggak muke* | Calophyllaceae | Calophyllum sp. | *Betor* |
| PP\_7 | OD | *tunggak muke* | Hypericaceae | *Cratoxylum glaucum* | *Gerunggang* |
| PP\_8 | OD | *tunggak muke* | Hypericaceae | *Cratoxylum glaucum* | *Gerunggang* |
| PP\_12 | OD | *tunggak muke* | Lauraceae | *Cryptocarya densiflora* | *Medang* |
| PP\_16 | OD | *tunggak muke* | Lauraceae | *Cryptocarya densiflora* | *Medang* |
| PP\_17 | OD | *tunggak muke* | Lauraceae | *Cryptocarya densiflora* | *Medang* |
| PP\_28 | OD | *tunggak muke* | Lauraceae | *Cryptocarya densiflora* | *Medang* |
| PP\_18 | OD | *tunggak muke* | Aquifoliaceae | *Ilex cymosa* | *Mensirak* |
| PP\_15 | OD | *tunggak muke* | Primulaceae | *Ardisia haseltii* | *Ubi-ubi* |
| PP\_5 | PH | *Bantaian* | Lauraceae | *Cryptocarya densiflora* | *Medang* |
| PP\_6 | PH | *Bantaian* | Lauraceae | *Cryptocarya densiflora* | *Medang* |
| PP\_3 | PH | *Tunggak Muke* | Myrtaceae | Syzygium urceolatum | *Samak* |
| PP\_4 | PH | *Tunggak Muke* | Myrtaceae | Syzygium urceolatum | *Samak* |
| PP\_13 | SH | *Bantaian* | Lauraceae | *Cryptocarya densiflora* | *Medang* |
| PP\_55 | SH | *tunggak muke* | Calophyllaceae | Calophyllum sp. | *Betor* |
| PP\_53 | SH | *Tunggak Muke* | Myrtaceae | *Tristaniopsis obovata* | *Pelawan* |
| PP\_2 | SH | *Tunggak Muke* | Dipterocarpaceae | *Hopea bilitonensis* | *Pelepak* |
| PP\_1 | SH | *Tunggak Muke* | Myrtaceae | Syzygium urceolatum | *Samak* |
| PP\_54 | SH | *Ungad* | Myrtaceae | *Melaleuca cajuputi* | *Gelam* |
| PP\_25 | SW | *Bantaian* | Calophyllaceae | Calophyllum sp. | *Betor* |
| PP\_39 | SW | *Bantaian* | Calophyllaceae | Calophyllum sp. | *Betor* |
| PP\_23 | SW | *Bantaian* | Hypericaceae | *Cratoxylum glaucum* | *Gerunggang* |
| PP\_24 | SW | *Bantaian* | Hypericaceae | *Cratoxylum glaucum* | *Gerunggang* |
| PP\_32 | SW | *Bantaian* | Hypericaceae | *Cratoxylum glaucum* | *Gerunggang* |
| PP\_40 | SW | *Bantaian* | Hypericaceae | *Cratoxylum glaucum* | *Gerunggang* |
| PP\_19 | SW | *Bantaian* | Lauraceae | *Cryptocarya densiflora* | *Medang* |
| PP\_22 | SW | *Bantaian* | Lauraceae | *Cryptocarya densiflora* | *Medang* |
| PP\_29 | SW | *Bantaian* | Pentaphylantaceae | *Eurya glabra* | *Pelempang putih* |
| PP\_38 | SW | *Bantaian* | Myrtaceae | *Syzygium acuminatissima* | *Sapat* |
| PP\_41 | SW | *Bantaian* | Myrtaceae | *Syzygium acuminatissima* | *Sapat* |
| PP\_33 | SW | *tunggak muke* | Calophyllaceae | Calophyllum sp. | *Betor* |
| PP\_31 | SW | *tunggak muke* | Hypericaceae | *Cratoxylum glaucum* | *Gerunggang* |
| PP\_34 | SW | *tunggak muke* | Hypericaceae | *Cratoxylum glaucum* | *Gerunggang* |
| PP\_35 | SW | *Tunggak Muke* | Hypericaceae | *Cratoxylum glaucum* | *Gerunggang* |
| PP\_36 | SW | *Tunggak Muke* | Hypericaceae | *Cratoxylum glaucum* | *Gerunggang* |
| PP\_37 | SW | *Tunggak Muke* | Hypericaceae | *Cratoxylum glaucum* | *Gerunggang* |
| PP\_30 | SW | *tunggak muke* | Myrtaceae | Syzygium urceolatum | *Samak* |
| **III. Tanjung Rusa** | | | | | |
| KMP\_8 | MG | *Tunggak Muke* | Myrtaceae | Syzygium urceolatum | *Samak* |
| KMP\_9 | MG | *Tunggak Muke* | Myrtaceae | Syzygium urceolatum | *Samak* |
| KMP\_2 | OD | *Bantaian* | Calophyllaceae | Calophyllum sp. | *Betor* |
| KMP\_1 | OD | *Bantaian* | Calophyllaceae | Calophyllum sp. | *Betor* |
| KMP\_3 | OD | *Bantaian* | Hypericaceae | *Cratoxylum glaucum* | *Gerunggang* |
| KMP\_7 | OD | *Bantaian* | Hypericaceae | *Cratoxylum glaucum* | *Gerunggang* |
| KMP\_5 | OD | *Bantaian* | Myrtaceae | *Syzygium urceolatum* | *Samak* |
| KMP\_6 | OD | *Bantaian* | Myrtaceae | *Syzygium urceolatum* | *Samak* |
| KMP\_4 | OD | *Tunggak Muke* | Myrtaceae | Syzygium urceolatum | *Samak* |
| TJ\_8 | SH | *Bantaian* | Proteacea | *Helicia robusta* | *Mengkikir* |
| TJ\_10 | SH | *Bantaian* | Proteacea | *Helicia robusta* | *Mengkikir* |
| TJ\_1 | SH | *Bantaian* | Myrtaceae | *Syzygium urceolatum* | *Samak* |
| TJ\_2 | SH | *Bantaian* | Myrtaceae | *Syzygium bankense* | *Sudong pelandok* |
| TJ\_4 | SH | *Tunggak Muke* | Lauraceae | *Cryptocarya densiflora* | *Medang* |
| TJ\_14 | SH | *Ungad* | Calophyllaceae | Calophyllum sp. | *Betor* |
| TJ\_5 | SH | *Ungad* | Araliaceae | *Arthrophyllum javanicum* | *Juluk Antu* |
| TJ\_3 | SH | *Ungad* | Proteacea | *Helicia robusta* | *Mengkikir* |
| TJ\_11 | SH | *Ungad* | Aquifoliaceae | *Ilex cymosa* | *Mensirak* |
| TJ\_7 | SH | *Ungad berseling* | Phyllanthaceae | *Aporosa frutescens* | *Pelangas* |

Abbreviations: MG = mangrove; SW = swamp; RP = riparian river; PO = palm oil plantation; OD = open degraded heath forest; SH = secondary heath forest; PH = primary heath forest

**Table S4.** All respondents from Perpat, Kembiri and Tanjung Rusa Villages were informed of the purpose of the research and signed the informed consent. An open questionnaire was used to ask all respondents the same questions.

|  |  |  |
| --- | --- | --- |
| **Informed Consent/** *Kesediaan mengisi Kuesioner*  If you declare that you are willing to freely participate in this research, the main researcher, Suci Dian Hayati, will ensure that the identity and data you provide will be used only for research purposes and will not be given to anybody, at any time, and for any reason.  *Jika saudara/i menyatakan BERSEDIA dengan sukarela untuk ikut serta dalam penelitian ini, maka Anda mendapatkan jaminan dari peneliti utama yaitu Suci Dian Hayati, bahwa identitas dan data yang Anda berikan hanya akan digunakan untuk keperluan penelitian dan tidak akan diberikan ke pihak siapapun, kapanpun, dan untuk kepentingan apapun.*  You may also be assured that you can discontinue the research at any moment and that your data will not be used. **If you do not agree** to participate in this study, you will not be able to complete the questionnaire.  *Anda juga mendapat jaminan bahwa Anda bisa menarik diri dari penelitian ini kapan saja dan dengan demikian data Anda tidak akan dipakai. Jika saudara/i TIDAK BERSEDIA mengikuti penelitian ini, maka pengisian kuesioner tidak akan dilanjutkan.* | | |
|
|
|  |  |  |
| Are you willing to participate in this study? | | Yes / No |
| *Apakah Anda bersedia ikut serta dalam penelitian ini?* | | *Ya/Tidak* |
|  | |  |
|  | |  |
| Signed  (*Tanda tangan*) | | …………………………….. |
|  | |  |
|  | |  |
|  | |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **The questionnaire form** | | | |
| 1. **Respondent identity (*Identitas Responden*)** | | | |
|  | Name  *Nama* | : |  |
|  | Gender  *Jenis Kelamin* | : | Male / Female  (*Pria / perempuan*) |
|  | Age  *Usia* | : |  |
|  | Address  *Alamat* | : |  |
|  | Main job  *Pekerjaan* | : |  |
|  | Contact number  *No Telepon* | : |  |
|  | Highest level of education  *Pendidikan terakhir* | : |  |
|  | Citizens  *Asal daerah* | : | Native / immigrants  *Penduduk asli / pendatang* |
|  | Ethnic  *Suku* | : |  |
|  | Role in *sunggau* tradition  *Status dalam tradisi sunggau* | : | Bee farmers/ smokers/ bee trees owner  *Petani lebah/ pengasap/ pemilik sambit* |

|  |  |  |  |
| --- | --- | --- | --- |
| 1. **Knowledge of *sunggau* (*pengetahuan tentang sunggau*)** | | | |
|  | When did you first get acquainted with *sunggau*?  *Usia berapa mengenal sunggau?* | : |  |
|  | When did you learn to construct sunggau?  *Usia berapa mulai belajar membangun sunggau?* | : |  |
|  | Who taught you to construct *sunggau*?  *Dari siapa anda belajar membangun sunggau?* | : |  |
|  | What kind of *sunggau* do you build? Apa saja tipe *sunggau* yang Anda pernah bangun? | : |  |
|  | Is there any specific location where you build them?  *Dimana saja Anda membangun sunggau?* | : |  |
|  | How do you choose the location to build *sunggau*?  *Bagaimana Anda menentukan lokasi untuk membangun sunggau?* | : |  |
|  | Are there any additional rules for *Sunggau* construction?  *Apakah ada persyaratan khusus saat membangun sunggau?* | : |  |

|  |  |  |  |
| --- | --- | --- | --- |
| 1. **Various of plant species used as *sunggau* (*jenis tumbuhan penopang sunggau*)** | | | |
|  | What plant species do you use and prefer to construct *sunggau*?  *Apa saja spesies tumbuhan yang pernah digunakan dan disukai untuk membangun sunggau?* | : |  |
|  | Where are those plants found?  *Dimana saja Anda mencari spesies tumbuhan untuk menopang sunggau?* | : |  |
|  | What are the criteria for choosing the plants to build *sunggau*?  *Apa saja kriteria/alasan pemilihan spesies tumbuhan penopang sunggau?* | : |  |
|  | Are those plants still abundant?  *Apakah jenis tumbuhan tersebut masih mudah ditemukan/melimpah?* | : |  |
|  | Are there any species that are becoming scarce? What is the reason?  *Apakah ada spesies tumbuhan penopang sunggau yang mulai sulit dijumpai?apa alasannya?* | : |  |

|  |  |  |  |
| --- | --- | --- | --- |
| 1. **Harvesting Honey (*panen madu*)** | | | |
|  | Do you collect your own *sunggau* honey? *Apakah Anda memanen sendiri madu dari sunggau?* | : |  |
|  | How many times a year is honey harvested ?  *Berapa kali madu di sunggau dapat dipanen?* | : |  |
|  | How is honey harvested? Did you remove the whole hive or just the honeycomb?  *Bagaimana anda memanen madu? Apakah dengan memotong seluruh sarang atau menyunat kantong madu?* | : |  |
|  | what plants are used as bee colony smokers?  *Apakah saja spesies tumbuhan yang digunakan sebagai bahan pengasapan?* | : |  |
|  | Where are those plants found? Are those plants still abundant?  *Dimana saja anda menemukan tumbuhan untuk pengasapan? Apakah jumlahnya masih melimpah?* | : |  |
|  | Who taught you how to collect honey and smoke the hive?  *Dari siapa anda belajar memanen madu dan melakukan pengasapan?* | : |  |
|  | How much honey is produced in a single harvest?  *Berapa banyak madu yang dihasilkan dalam sekali panen?* | : |  |
|  | How do you divide the honey that has been harvested? *Bagaimana anda membagi hasil panen madu?* | : |  |
|  | Where do you sell collected honey? How much does it cost?  *Kemana anda menjual madu yang dipanen? Berapa harganya?* | : |  |
|  | Is honey sales profitable?  *Apakah menjual madu menguntungkan?* | : |  |

|  |  |  |  |
| --- | --- | --- | --- |
| 1. **Conservation of *sunggau* (*konservasi sunggau*)** | | | |
|  | Is there a predator that attack the *sunggau* or colonies?  *Apakah ada predator yang kerap menyerang sunggau atau koloni?* | : |  |
|  | What actions can be taken to protect the *sunggau* and bees?  *Apa yang bisa dilakukan untuk melestarikan sunggau dan lebah Apis dorsata?* | : |  |
|  | What are the challenges that beekeepers in Membalong face today?  *Apa saja tantangan yang dihadapi petani lebah di Membalong saat ini?* | : |  |