

menyediakan tanaman sumber pakan lebah di sekitar sarang. Adanya usaha ini diharapkan juga dapat menjaga kelestarian hayati.

## DAFTAR PUSTAKA

- Aguilar, I. and Briceño D., 2002, *Sounds in Melipona costaricensis (Apidae: Meliponini): effect of sugar concentration and nectar source distance*, hal: 376-377, Journal Article.
- Agussalim, Agus A., Umami, N., dan Budisatria I. G. S., 2017, Variasi Jenis Tanaman Pakan Lebah Madu Sumber Nektar Dan Polen Berdasarkan Ketinggian Tempat Di Yogyakarta, *Buletin Peternakan* Vol. 41 (4): 448-460, Journal Article.
- Al-Attas, A. S., 2008, *Perkembangan Koloni Lebah Madu Apis melifera yang Mendapat Tepung Keong Mas (Pomacea sp.) Sebagai Suplemen Polen.skripsi*. Program Studi Teknologi Produk Ternak Fakultas Peternakan ITB, Thesis.
- Amelia, S. dan Soekardi, H., 2014, Analisis Pollen Pakan Apis cerana Fabr. Dan Kandungan Proteinnnya pada Dua Lokasi yang Berbeda, *Prosiding Seminar Nasional Pengembangan Teknologi Pertanian*, ISBN 978-602-70530-0-7, hal. 514-523.
- Angraini, A. D., 2006, *Potensi Propolis Lebah Madu Trigona sp. Sebagai Bahan Anti Bakteri*, Program Studi Biokimia Fakultas Matematika dan Ilmu Pengetahuan Alam, Institut Pertanian Bogor, Thesis.
- APSA Members. 2007. *The Australasian Pollen and Spore Atlas*, Australian National University Canberra, <http://apsa.anu.edu.au/>, diakses pada 18 September 2020, Web Page.
- Balai Penelitian dan Pengembangan Teknologi Hasil Hutan Bukan Kayu (BPPTHBK), 2018, *Panduan Singkat Budidaya dan Breeding Lebah Trigona sp.*, Lombok Barat, Nusa Tenggara Barat.
- Bankova VS, Castro SL, Marcucci MC, 2000, Propolis: recent advances in chemistry and plant origin, *INRA/DIB/AGIB/EDP Sciences, Apidologie* 31:3-15, Journal Article.
- Bogdanov, S., 2016, *Beeswax: Production, Properties Composition and Control*, Dalam: *Beeswax Book, Chapter 1*, Bee Product Science, [www.bee-hexagon.net](http://www.bee-hexagon.net), hal. 2-3.
- Bogdanov, S., Jurendic, T., Sieber, R., & Gallmann, P., 2008, Honey for Nutrition and Health: A Review, *Journal of the American College of Nutrition*, Vol. 27(6), 677–689. Journal Article.
- Chillemi, S., dan Chillemi, M., 2013, *The Complete Herbal Guide: A Natural Approach to Healing the Body - Heal Your Body Naturally and Maintain*

*Optimal Health Using Alternative Medicine, Herbs, Vitamins, Fruits and Vegetables*, Stacey Chillemi on Lulu, Hal. 485-488.


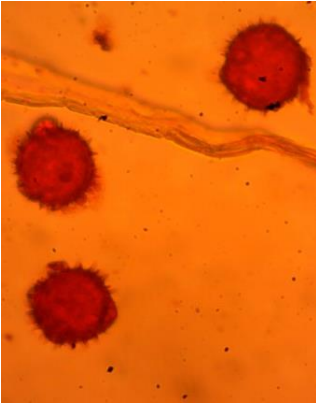



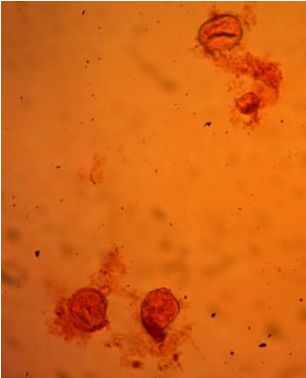
- Chuttong B., Phongphisutthinant R., Sringarm K., Burgett M., and Barth O. M., 2018, Nutritional Composition of Pot-Pollen from Four Species of Stingless Bees (Meliponini) in Southeast Asia, *Chiang Mai University*, Thailand, DOI: 10.1007/978-3-319-61839-5\_22, Journal Article.
- Ciar, R. R., Bonto, L. S., Bayer, Mc H. P., Rabajante, J. F., Lubag, S. P., Fajardo, A. C., Cervancia, C. R., 2013, *Foraging Behavior of Stingless Bees (Tetragonula biroi Friese): Distance, Direction, and Height of Preferred Food Source*, University of the Philippines Los Baños, Thesis.
- Erniwati. 2013. Kajian biologi lebah tak bersengat (Apidae: Trigona) di Indonesia. *MZI*. 12(1): 29-34.
- Eviana, E., 2017, *Strategi Pengembangan Budidaya Lebah Madu di Desa Buana Sakti Kecamatan Batang Hari Kabupaten Lampung Timur*, Sekolah Tinggi Ilmu Pertanian Dharma Wacana Metro, Thesis.
- Fauzia, S., Sukarasa, Herawati, W., 2019, Karakteristik Morfologi Pollen Sebagai Sumber Pakan Lebah *Trigona* sp. di Desa Serang, Purbalingga, *BioEksata: Jurnal Ilmiah Biologi Unsoed*, Vol. 1 No. 2, ISSN: 2714-8564, hal. 117-119, Journal Article.
- Gómez-Caravaca AM, Gómez-Romero M, Arráez-Román D, Segura-Carretero A, Fernández-Gutiérrez A., 2006, Advances in the analysis of phenolic compounds in products derived from bee, *Journal of Pharmaceutical and Biomedical Analysis*, 41:1220–34. Journal Article.
- Guntoro, Y. P., 2013, *Aktivitas dan Produktivitas Lebah Trigona laeviceps di Kebun Polikultur dan Monokultur Pala (Myristica fragrans)*, Departemen Ilmu Produksi dan Teknologi Peternakan Institut Pertanian Bogor, Thesis.
- Junus, M., 2004, Pengaruh Umur Lebah Ratu, Jumlah Sisiran Eram, dan Penyekat Ratu terhadap Pertambahan Bobot Anggota Koloni Lebah *Apis mellifera*, *Jurnal. Ilmu-ilmu Peternakan*, ISSN: 0852-3581, 3-6, Journal article.
- Kamilia, A., Devi, Sukrasno, Irda Fidrianny, 2010, *Characterization of Bee Pollen From Ranca Bungur, Bogor, Proceedings of the Third International Conference on Mathematics and Natural Sciences*, hal.173–185, Conference Paper.
- Kapitanhиту, R., Cahyono T. D., Kaliky F., 2018, Keeratan Hubungan antara Dimensi Sarang Bambu dan Perkembangbiakan Lebah *Trigona* sp., *Jurnal Riset Industri Hasil Hutan* Vol.10, No.2, hal. 85-89, Journal Article.
- Kementerian Lingkungan Hidup dan Kehutanan, 2018, *Status Hutan dan Kehutanan Indonesia*. Kementerian Kehutanan. Jakarta.




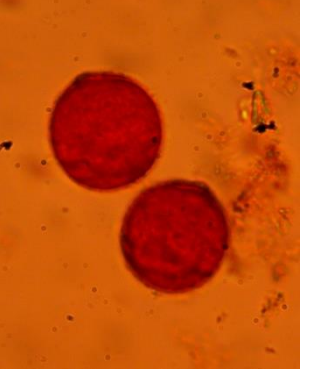



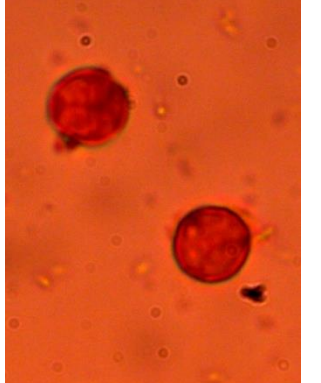
- Kementrian Kehutanan Badan Penelitian dan Pengembangan Kehutanan Balai Penelitian Teknologi Serat Tanaman Kehutanan, 2012, *Roadmap Penelitian Perlebahan.Riau*, ISBN: 978-602-19318-4-4.
- Kementrian Lingkungan Hidup dan Kehutanan, 2017, *Laporan Kinerja Direktorat Jendral Pengelolaan Hutan Produksi Lestari*: 31, 63-65.
- Lima, D. de, Lamerkabel J.S.A. dan Weleburun I., 2019, Inventarisasi Jenis-Jenis Tanaman Penghasil Nektar dan Pollen Sebagai Pakan Lebah Madu Apis melifera di Kecamatan Kairatu Kabupaten Seram Bagian Barat, *Agrinimal* Vol. 7, No.2, hal. 77-82. Journal Article.
- Mackenzie, G., Boa, A. N., Diego-Taboada, A., Atkin, S. L., Sathyapalan, T., 2015, *Sporopollenin the Last Known Yet Toughest Natural Biopolymer*, *Frontiers in Materials* Article, hal. 2-3.
- Michener C. D., 2007, *The Bees of The World*. Second Edition. Baltimore (US): The Johns Hopkins University Press. Hal. 803.
- Michener C.D., 2013, *Pot-Honey: A Legacy of Stingless Bee*, Pedro SRM, Roubik DW, New York (US): Springer Hal. 3-17
- Nugroho, R. B. dan Soesilohadi RC. H., 2014, Identifikasi Macam Sumber Pakan Lebah *Trigona sp* (Hymenoptera: *Apidae*) di Kabupaten Gunungkidul, *Biomedika* ISSN: 2302-1306, hal. 43-45, Journal Article.
- Nugroho, S. H., 2014, Karakteristik Umum Pollen dan Spora Serta Aplikasinya, *Osaena*, Volume XXXI, ISSN 0216-1877, *Pusat Penelitian Laut Dalam LIPI-Ambon*, hal 8-11, Jurnal Article.
- Octaviani, W., Sadapotto, A., Nuraeni S., 2020, Quality Test Comparison for *Wallacetrigona incisa* and *Tetragonula biroi* Honey in Mappedeceng District, North Luwu Regency, South Sulawesi Provice, *Advance in Enviromental Biology*, DOI:1022587, hal 1-5, Journal Article.
- Oktavia R., 2017, *Pakan Buatan yang Lebih Disukai Lebah Pekerja Apis cerana Fabr. (Hymenoptera: Apidae) pada Apiari Sakato Palak Juha Nagari Lurah Ampalu VII Koto Sungai Sariak Padang Pariaman*, Studi Pendidikan Biologi STKIP PGRI Sumatra Barat, Thesis.
- Olusola A. dan Oluwatoyin O., 2009. Nectar Sources for the Honey Bee (*Apis mellifera adansonii*) Revealed by Pollen Content, University of Lagos. *Department of Botany and Microbiology Akoka Lagos Academic Press Nigeria*, ISSN 1842-4309, 211-217, Journal Article.
- Putra, R. E., Subagio, J., Kinasih, I., Permana, A. D., dan Rosmiati, M., 2017, Pola Kunjungan Serangga Liar dan Efek Penambahan Koloni *Trigona (Tetragonula) Laeviceps* Smith pada Penyerbukan kabocha (*Cucurbita maxima*), *Indonesia Journal of Entomology*, Vol.14 No. 2 ISSN: 1829-7722, hal. 72-77.

- Ramadani, R. F., 2016, *Keanekaragaman Pollen dari Beberapa Spesies Stingless Bee Perkebunan Kelapa Sawit dan Karet*, Biosains Hewan Institut Pertanian Bogor, Thesis.
- Saepudin, R., 2016, Upaya Peningkatan Produktivitas Kebun Strowberi, Koloni Lebah dan Produksi Madu di Kabupaten Rejang Lebong Provinsi Bengkulu. *Ilmu-Ilmu Peternakan* Vol. XIX No.2 eISSN: 2528 0805, 95-96, Journal Article.
- Situmorang, R. O. P. dan Hasanuddin A., 2014, Panduan Manual Budidaya Lebah Madu, Balai Penelitian Kehutanan Aek Nauli, hal. 2-6
- Suedy, S.W.A. 2012. *Paleorekonstruksi Vegetasi Dan Lingkungan Menggunakan Fosil Polen Dan Spora Pada Formasi Tapak Cekungan Banyumas Kala Plio-Plistosen*. Sekolah Pascasarjana Institut Pertanian Bogor, Thesis.
- Sulistia, M.L., 2015, Identifikasi *Jenis Polen Sebagai Sumber Pakan Lebah Trigona (Trigona clypearis) di Lahan Agroforestri*, Program studi kehutanan Universitas Mataram, Thesis.
- Sulistiyorini, A. C., 2006, *Inventarisasi Tanaman Pakan Lebah Madu Apis cerana Ferb di Perkebunan Teh Gunung Mas Bogor*, Institut Pertanian Bogor, Thesis.
- Taha, E.K. A., 2015. A Study on Nectar and Pollen Sources for Honeybee, Apis mellifera L. in Al-Ahsa Saudi Arabia. *Journal of Entomology and Zoology Studies*, E-ISSN: 2320-7078, Saudi Arabia, Journal Article.
- Tim Karya Tani Mandiri.2010. *Pedoman Budidaya Lebah Madu*. CV Nuansa Aulia. Bandung.
- Wahyuni, N. and Anggadhania L., 2020, *The characteristic of stingless bee's products (Tetragonula spp.) in Lombok Island*, The 3rd Internasional Conference on Biosciences, IOP Conf. Series: Earth and Environmental Science 457 (2020) 012045, hal. 2-4.
- Wati, D. L., 2013, *Aktivitas terbang harian dan mencari polen trigona laeviceps Smith DI PERKEBUNAN KARET (Hevea braziliensis) DAN KELAPA SAWIT (Elaeis guineensis)*, Departemen Biologi Fakultas Matematika dan Ilmu Pengetahuan Alam, Institut Pertanian Bogor. Thesis.
- Wingenroth, M. C., 2001, Honey Types and Pollen Grains of Asunción, Lavalle, Mendoza, Argentina (32°33'21''S/68°14'45''W), Vegetal Origin and Possible Management of the Beehive Production, *Proceedings of the 37th International Apicultural Congress*, 28 October – 1 November 2001, Durban, South Africa, Conference Paper.


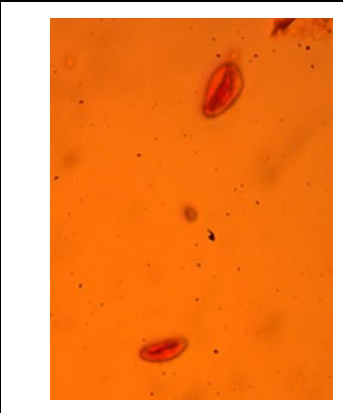

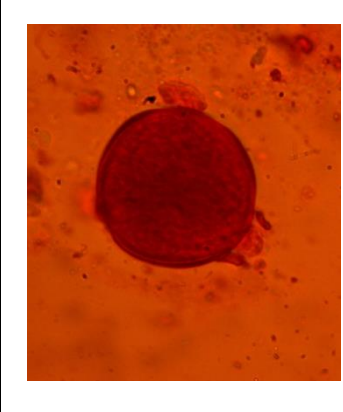

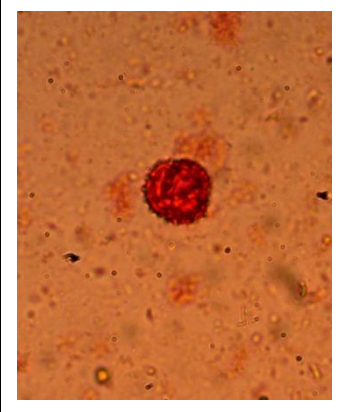

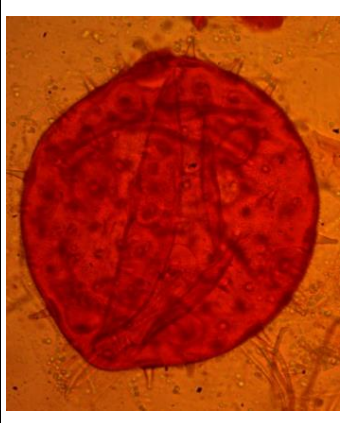
## LAMPIRAN


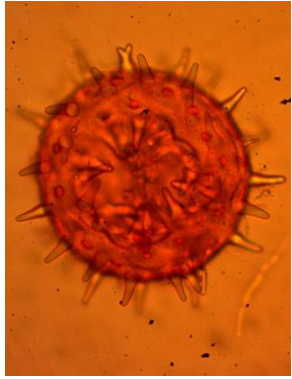

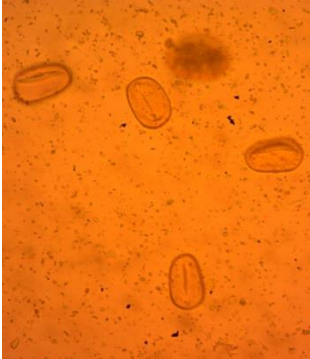

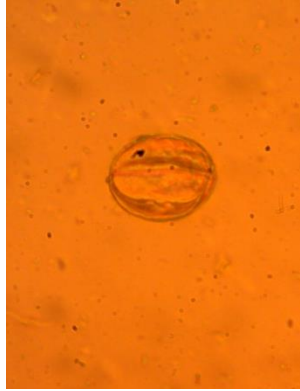

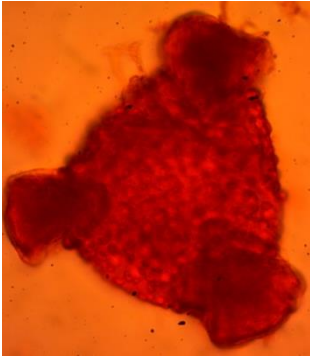
Lampiran 1. Stuktur dan morfologi polen bunga mekar di sekitar areal peternakan


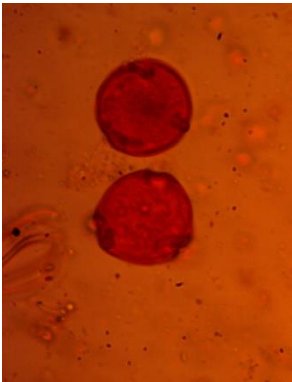

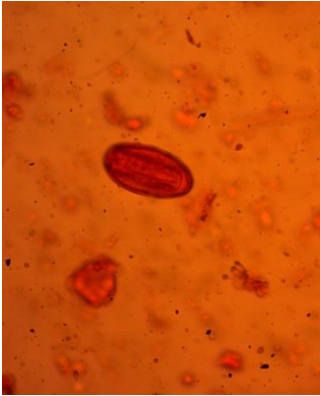

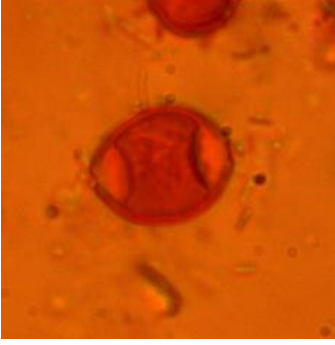

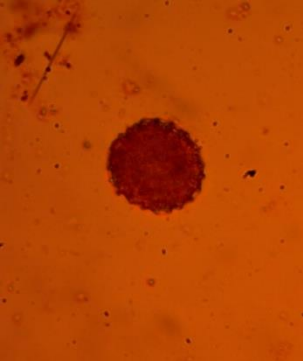
No.	Bunga Mekar	Gambar Polen	Klasifikasi
1.			<p>Bunga Matahari</p> <p><i>Regnum : Plantae</i>  <i>Class : Magnoliopsida</i>  <i>Ordo : Asterales</i>  <i>Family: Asteraceae</i>  <i>Genus : Helianthus</i>  <i>Species: Helianthus annuus L</i></p>
2.			<p>Bunga Pukul 8</p> <p><i>Regnum : Plantae</i>  <i>Class : Magnoliopsida</i>  <i>Ordo : Violales</i>  <i>Family : Turneraceae</i>  <i>Genus : Turnera</i>  <i>Species : Turnera subulate</i></p>
3.			<p>Rumput Pendul</p> <p><i>Regnum : Plantae</i>  <i>Class: Monocotyledoneae</i>  <i>Ordo : Cyperales</i>  <i>Family : Cyperaceae</i>  <i>Genus : Kyllinga</i>  <i>Species : Kyllinga brevifolia</i></p>


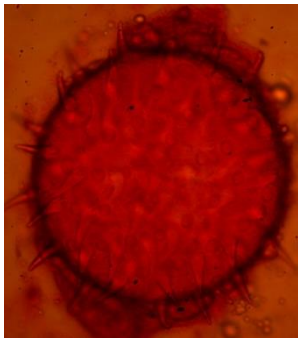

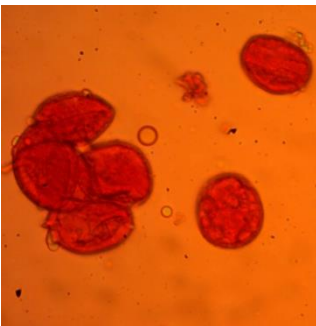



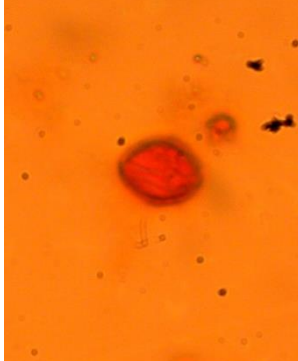
4.			<p>Zinnia  Anggun/Kembang  Kertas</p> <p><i>Regnum : Plantae</i>  <i>Class : Angiospermae</i>  <i>Ordo : Asterales</i>  <i>Family : Asteraceae</i>  <i>Genus : Zinnia</i>  <i>Species : Zinnia elegans</i>  <i>Jacq</i></p>
5.			<p>Pepaya</p> <p><i>Regnum : Plantae</i>  <i>Class : Dicotyledoneae</i>  <i>Ordo : Cistales</i>  <i>Family : Caricaceae</i>  <i>Genus : Carica</i>  <i>Species : Carica pepaya</i>  <i>L.</i></p>
6.			<p><i>Regnum : Plantae</i>  <i>Class : Angiospermae</i>  <i>Ordo : Rosales</i>  <i>Family : Mimosaceae</i>  <i>Genus : Mimosa</i>  <i>Species : Mimosa pigra</i>  <i>L</i></p>
7.			<p>Putri Malu</p> <p><i>Regnum : Plantae</i>  <i>Class : Angiospermae</i>  <i>Ordo : Rosales</i>  <i>Family : Mimosaceae</i>  <i>Genus : Mimosa</i>  <i>Species : Mimosa pudica</i>  <i>Linn</i></p>


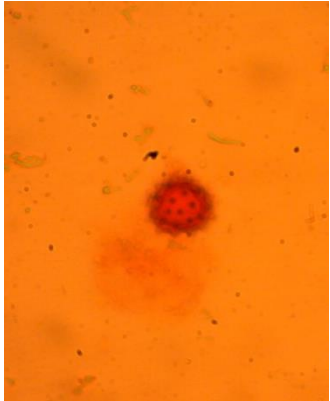



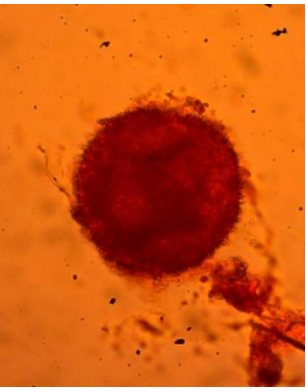

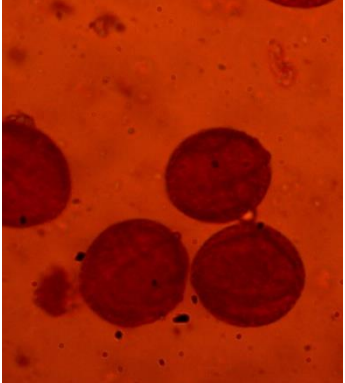



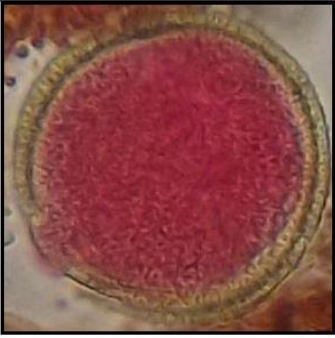
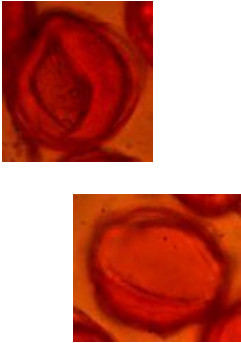
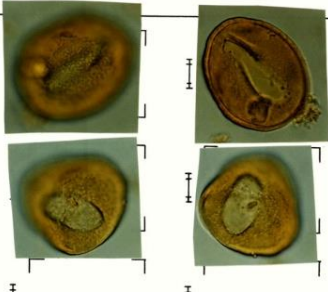
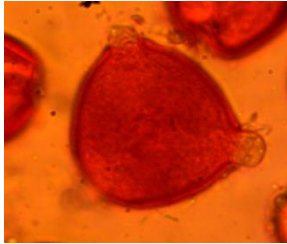

8.			<p><i>Begonia cucullata</i></p> <p>Regnum : <i>Plantae</i>  Class : <i>Angiospermae</i>  Ordo : <i>Cucurbitales</i>  Family : <i>Begoniaceae</i>  Genus : <i>Begonia</i>  Species : <i>Begonia cucullata</i></p>
9.			<p>Regnum : <i>Plantae</i>  Class : <i>Magnoliopsida</i>  Ordo : <i>Fabales</i>  Family : <i>Fabaceae</i>  Genus : <i>Leucaena</i>  Species : <i>Leucaena leucocephala</i></p>
10.			<p>Bandotan</p> <p>Regnum : <i>Plantae</i>  Class : <i>Magnoliopsida</i>  Ordo : <i>Asterales</i>  Family : <i>Asteraceae</i>  Genus : <i>Ageratum</i> Linn  Species : <i>Ageratum conyzoides</i> Linn</p>
11.			<p>Regnum : <i>Plantae</i>  Class : <i>Magnoliopsida</i>  Ordo : <i>Cucurbitales</i>  Family : <i>Cucurbitaceae</i>  Genus : <i>Cucurbita</i>  Species : <i>Cucurbita maxima</i></p>

12.			<p>Kembang Sepatu</p> <p><i>Regnum : Plantae</i>  <i>Class : Dicotyledonae</i>  <i>Ordo : Malvales</i>  <i>Family : Malvaceae</i>  <i>Genus : Hibiscus</i>  <i>Species : Hibiscus rosa-sinensis L.</i></p>
13.			<p><i>Regnum : Plantae</i>  <i>Class : Liliopsida</i>  <i>Ordo : Liliales</i>  <i>Family : Iridaceae</i>  <i>Genus : Eleutherine</i>  <i>Species : Eleutherine sp.</i></p>
14.			<p>Asoka</p> <p><i>Regnum : Plantae</i>  <i>Class : Magnoliopsida</i>  <i>Ordo : Fabales</i>  <i>Family :Caesalpiniaceae</i>  <i>Genus : Ixora</i>  <i>Species : Ixora sp.</i></p>
15.			<p>Pecut Kuda</p> <p><i>Regnum : Plantae</i>  <i>Class : Magnoliopsida</i>  <i>Ordo : Lamiales</i>  <i>Family : Verbenaceae</i>  <i>Genus : Stachytarpheta</i>  <i>Species : Stachytarpheta indica</i></p>

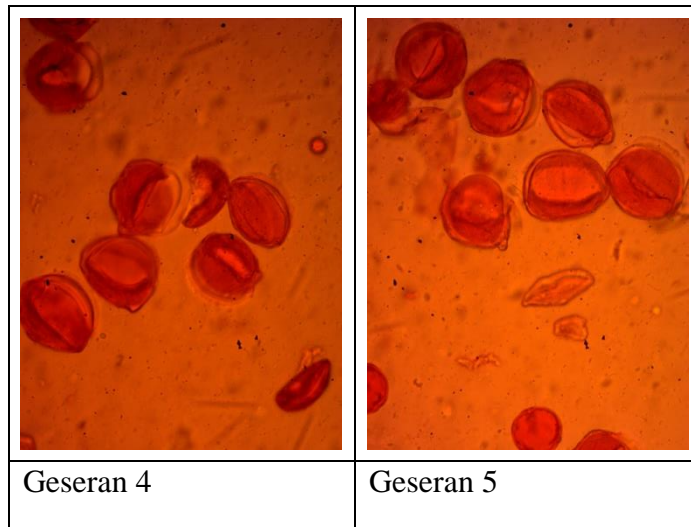
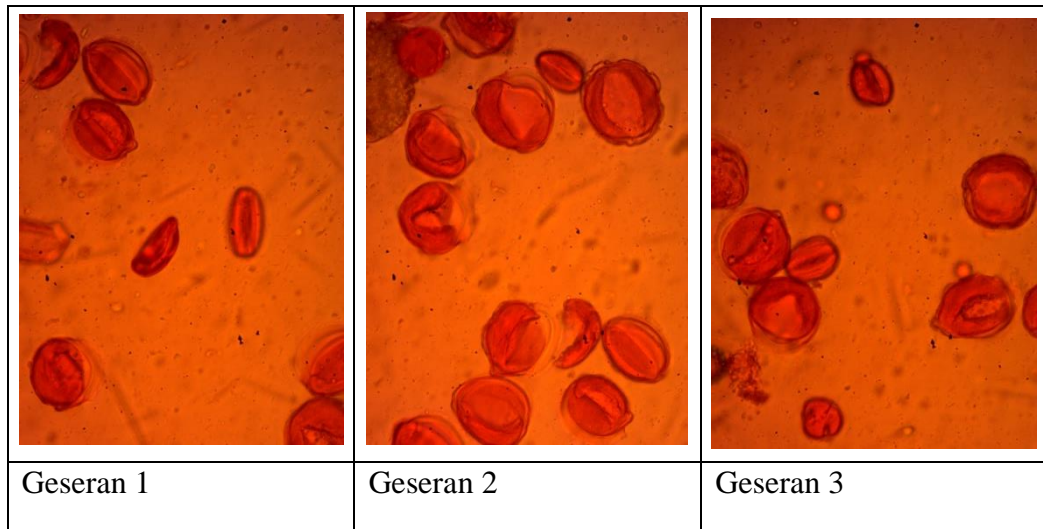
16.			<p><b>Kelor</b></p> <p><i>Regnum : Plantae</i>  <i>Class : Magnoliopsida</i>  <i>Ordo : Brassicales</i>  <i>Family : Moringaceae</i>  <i>Genus : Moringa</i>  <i>Species : Moringa Oleifera Lamk, L</i></p>
17.			<p><b>Jati</b></p> <p><i>Regnum : Plantae</i>  <i>Class : Magnoliopsida</i>  <i>Ordo : Lamiales</i>  <i>Family : Lamiaceae</i>  <i>Genus : Tectona</i>  <i>Species : Tectona grandis</i></p>
18.	<p>Sumber: (Chuttong B., et al, 2018)</p> 		<p><b><i>Terma micrantha</i></b></p>
19.			<p><b>Bunga Kertas</b></p> <p><i>Regnum : Plantae</i>  <i>Class : Magnoliopsida</i>  <i>Ordo : Caryophyllales</i>  <i>Family : Nyctaginaceae</i>  <i>Genus : Bougainvillea</i>  <i>Species : Bougainvillea sp.</i></p>

20.			<p><i>Urena lobata L</i></p> <p>Regnum : <i>Plantae</i>  Class : <i>Magnoliopsida</i>  Ordo : <i>Malvales</i>  Family : <i>Malvaceae</i>  Genus : <i>Urena</i>  Species : <i>Urena lobata L.</i></p>
21.			<p><i>Torenia fournieri</i></p> <p>Regnum : <i>Plantae</i>  Class : <i>Magnoliopsida</i>  Ordo : <i>Lamiales</i>  Family : <i>Linderniaceae</i>  Genus : <i>Torenia</i>  Species : <i>Torenia fournieri</i></p>
22.			<p>Rambusa</p> <p>Regnum : <i>Plantae</i>  Class : <i>Magnoliopsida</i>  Ordo : <i>Malpighiales</i>  Family : <i>Passifloraceae</i>  Genus : <i>Passiflora</i>  Species : <i>Passiflora foetida L.</i></p>
23.			<p><i>Begonia aconitifolia</i></p> <p>Regnum : <i>Plantae</i>  Class : <i>Angiospermae</i>  Ordo : <i>Cucurbitales</i>  Family : <i>Begoniaceae</i>  Genus : <i>Begonia</i>  Species : <i>Begonia aconitifolia</i></p>

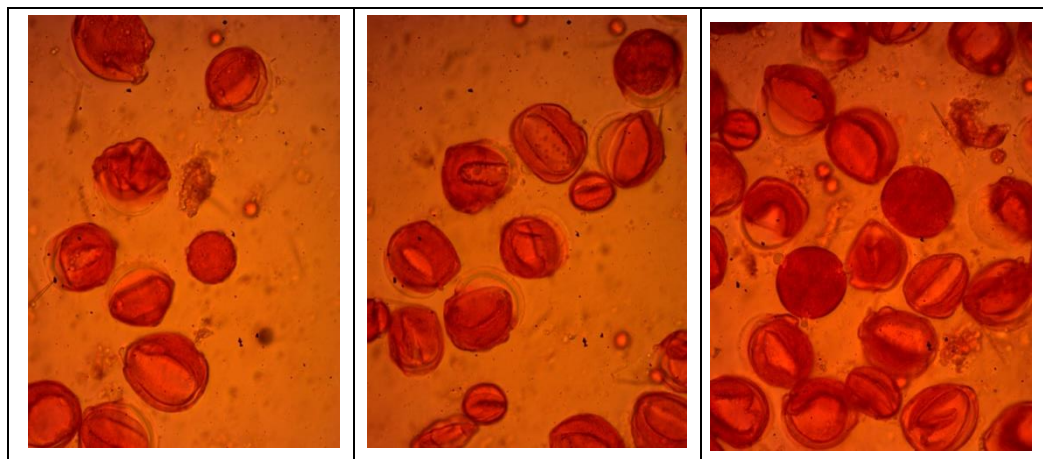
24.			<p><i>Regnum : Plantae</i>  <i>Class : Magnoliopsida</i>  <i>Ordo: Asterales</i>  <i>Family : Asteraceae</i>  <i>Genus : Melampodium</i>  <i>Species : Melampodium divaricatum (Rich.) DC.</i></p>
25.			<p><i>Persicaria virginiana</i>  <b>ANKNOWN SPECIES</b></p>
26.			<p><i>Portulaca grandiflora</i>  <i>Regnum : Plantae</i>  <i>Class : Angiospermae</i>  <i>Ordo: Caryophyllales</i>  <i>Family : Portulacaceae</i>  <i>Genus : Portulaca</i>  <i>Species : Portulaca grandiflora</i></p>
27.			<p><b>Jeruk Nipis</b>  <i>Regnum : Plantae</i>  <i>Class: dicotyledonae</i>  <i>Ordo: Rurales</i>  <i>Family : Rutaceae</i>  <i>Genus : Citrus</i>  <i>Species : Citrus aurantifolia</i></p>

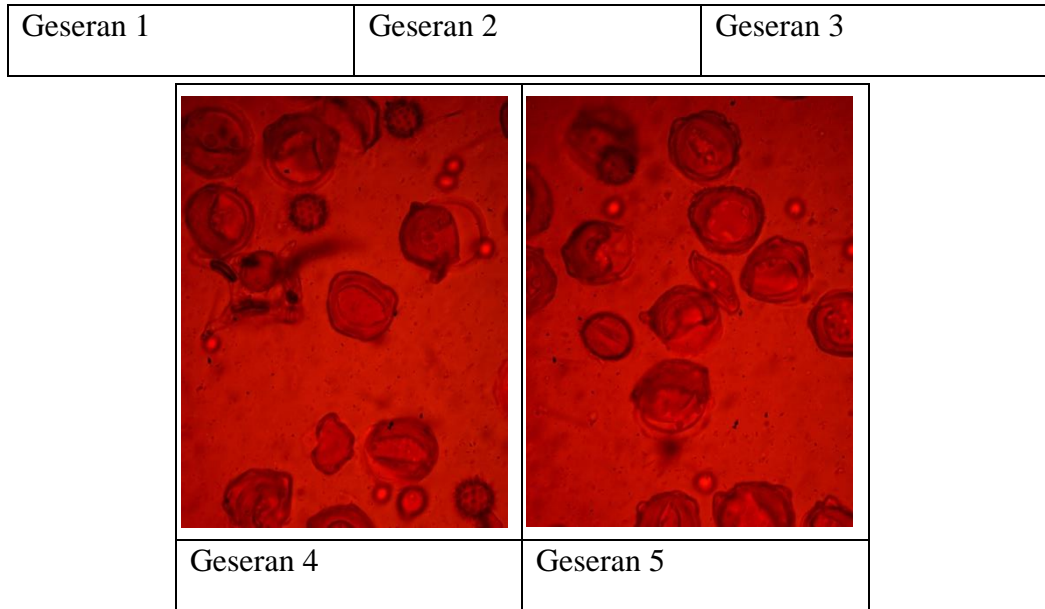
27.			<p><i>Air Mata Pengantin</i></p> <p><i>Regnum : Plantae</i>  <i>Class : Angiospermae</i>  <i>Ordo: Caryophyllales</i>  <i>Family : Polygonaceae</i>  <i>Genus : Antigonon</i>  <i>Species : Antigonon sp.</i></p>
28.	<p>Polen pada sarang:</p> 	<p>Australasian Pollen and Spore Atlas:  <a href="http://apsa.anu.edu.au/sample/13601?order=desc&amp;q=Cocos&amp;sort=rel">http://apsa.anu.edu.au/sample/13601?order=desc&amp;q=Cocos&amp;sort=rel</a></p> 	<p><i>Kelapa</i></p> <p><i>Regnum : Plantae</i>  <i>Class: Monocotyledoneae</i>  <i>Ordo: Arecales</i>  <i>Family : Arecaceae</i>  <i>Genus : Cocos</i>  <i>Species : Cocos Nucifera</i>  <i>Linn</i></p>
29.	<p>Polen pada sarang:</p> 		<p><i>Rambutan</i></p> <p><i>Regnum : Plantae</i>  <i>Class: dicotyledonae</i>  <i>Ordo: sapindales</i>  <i>Family : Sapindaceae</i>  <i>Genus : Nephelium</i>  <i>Species : Nephelium lappaceum</i></p>

Lampiran 2. Gambar polen pada *bee bread* menggunakan mikroskop dengan perbesaran 40X

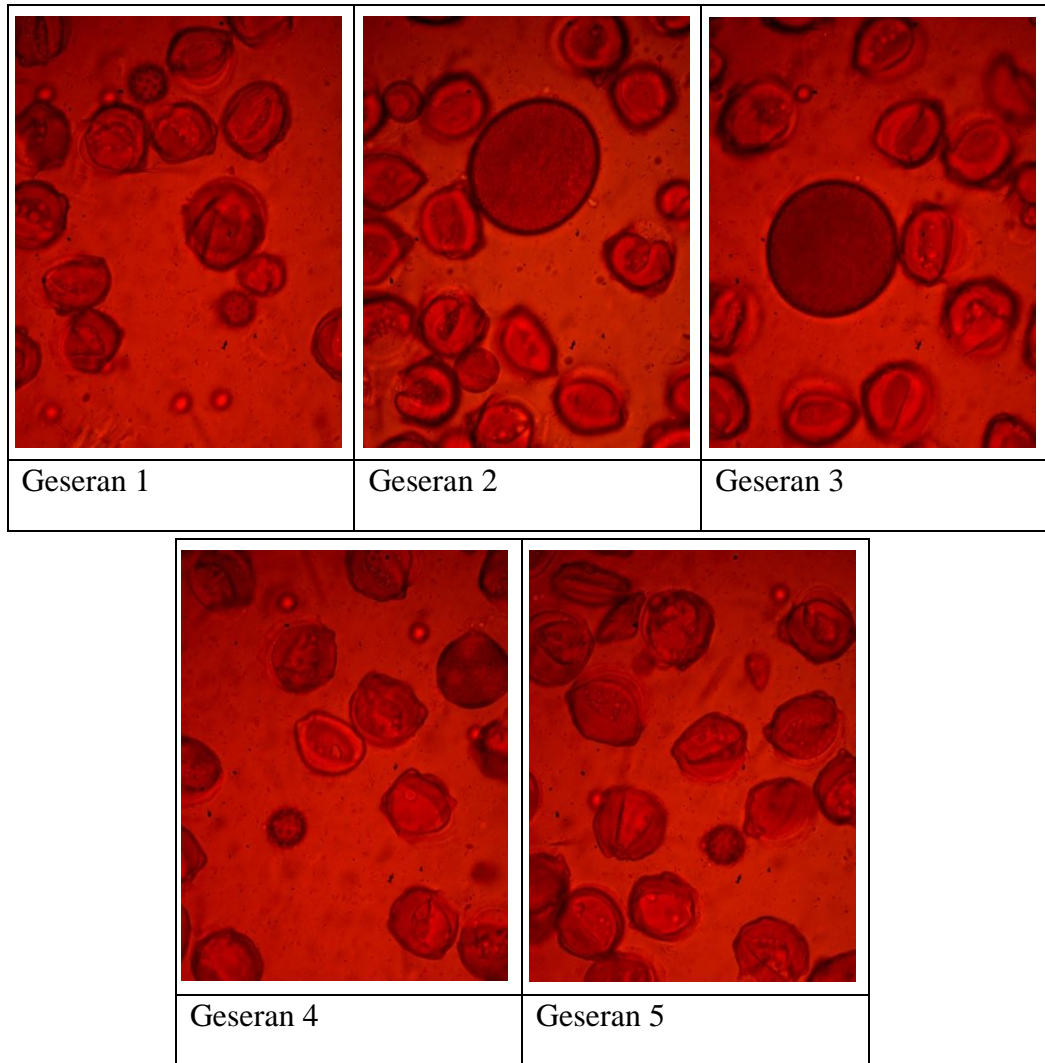


Gambar Polen pada *bee bread* koloni 1 tahap 1



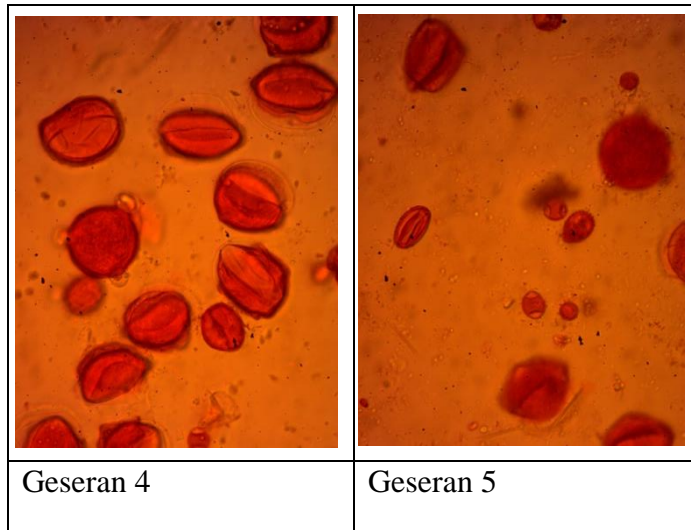
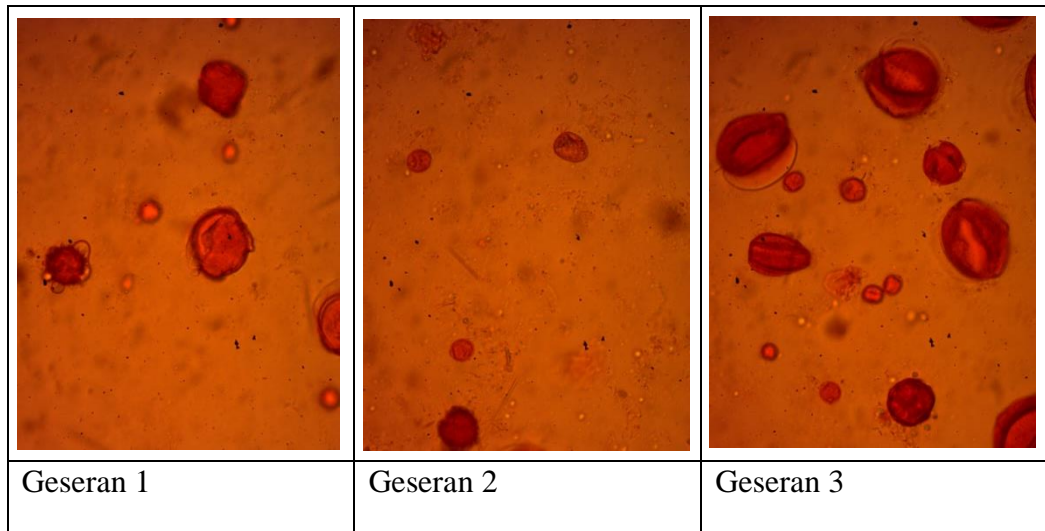


Gambar Polen pada bee bread koloni 1 tahap 2

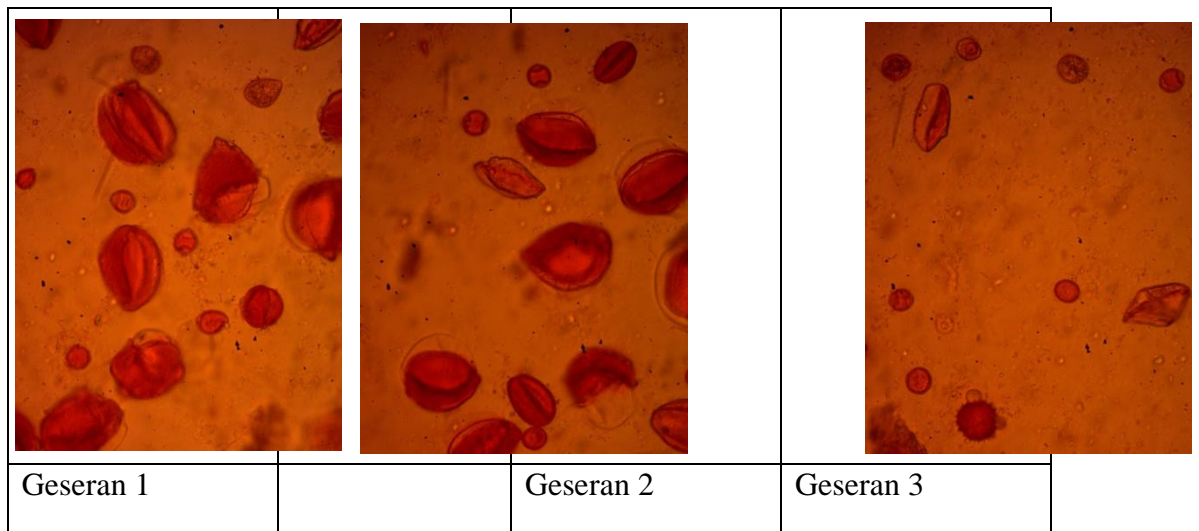


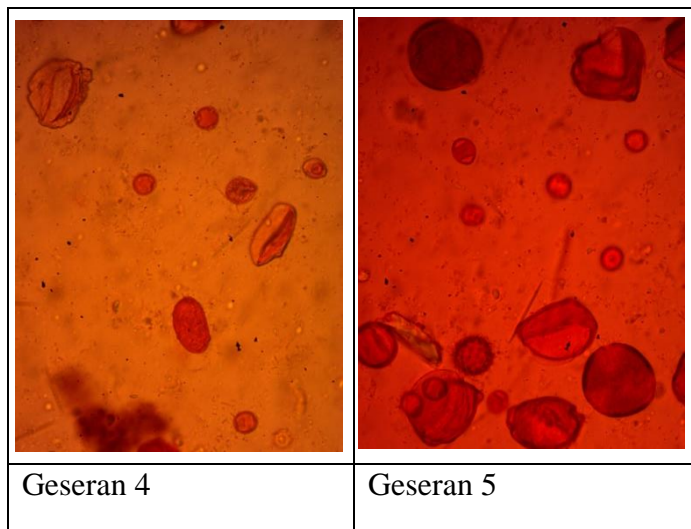


Gambar Polen pada bee bread koloni 1 tahap 3

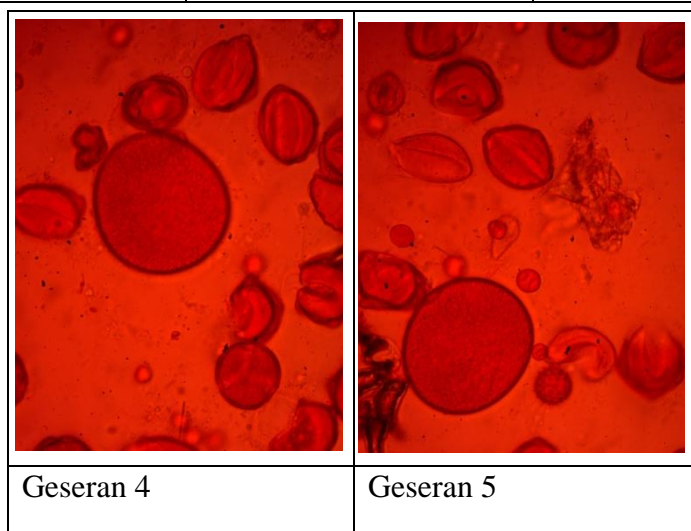
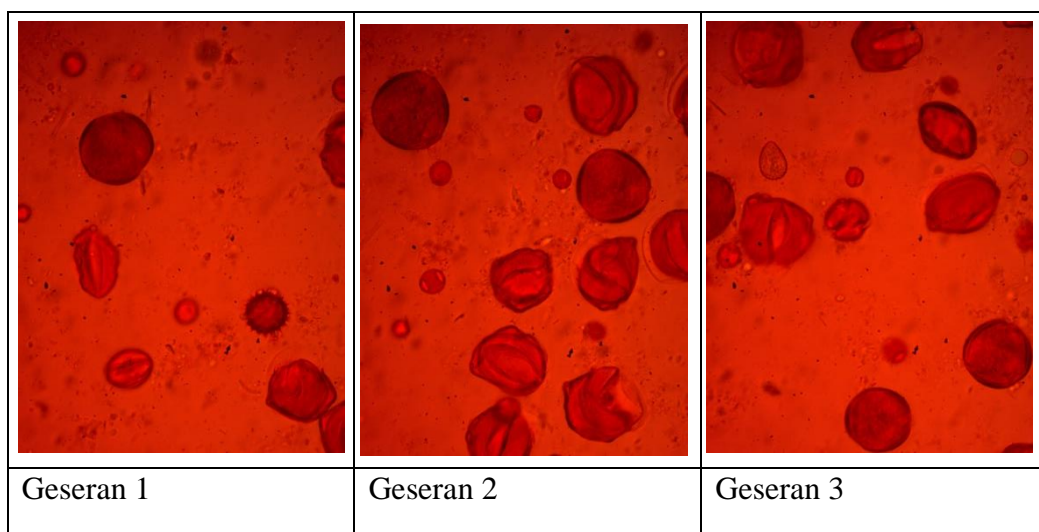


Gambar Polen pada bee bread koloni 2 tahap 1

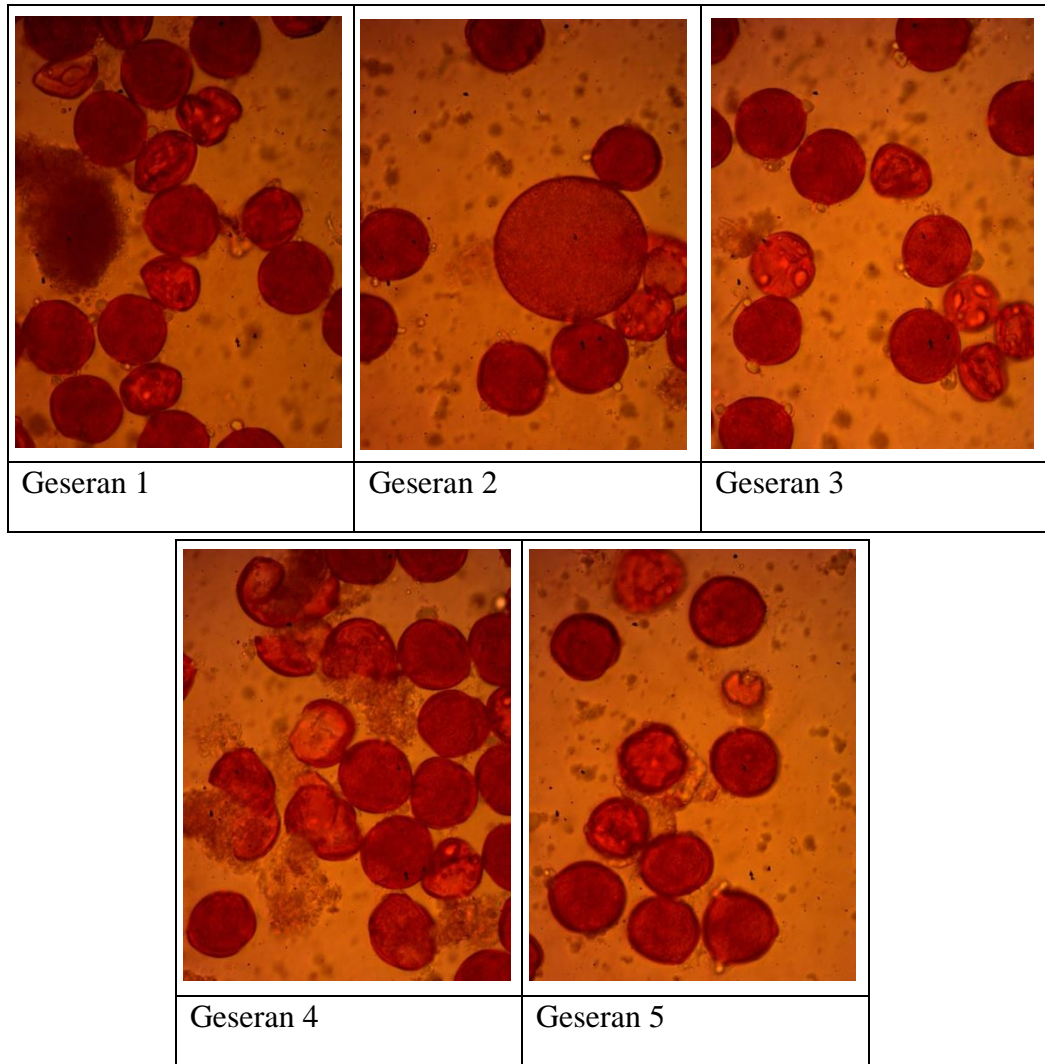




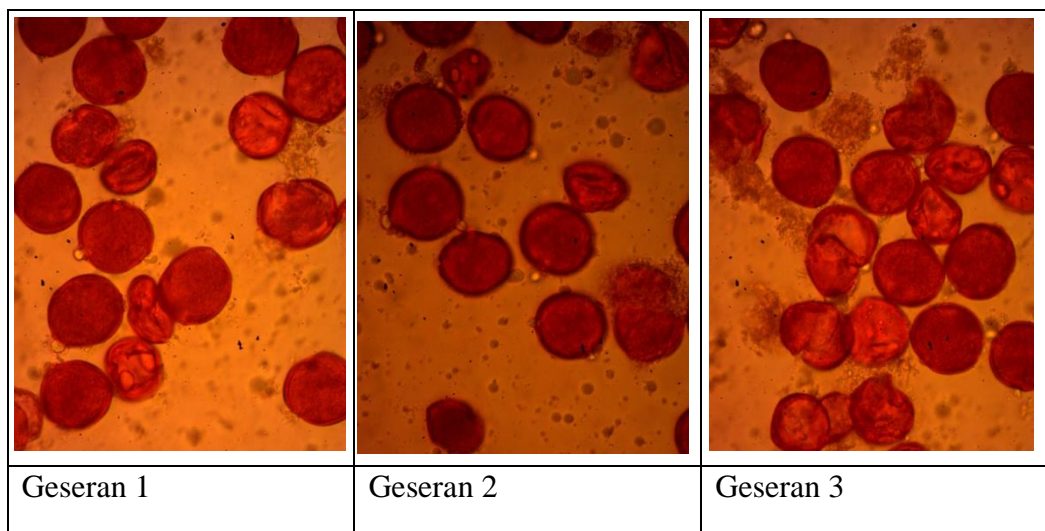
Gambar Polen pada bee bread koloni 2 tahap 2

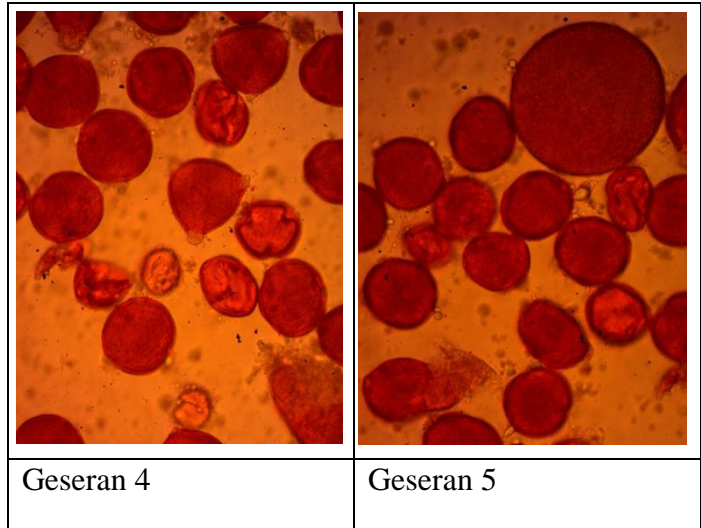


Gambar Polen pada bee bread koloni 2 tahap 3

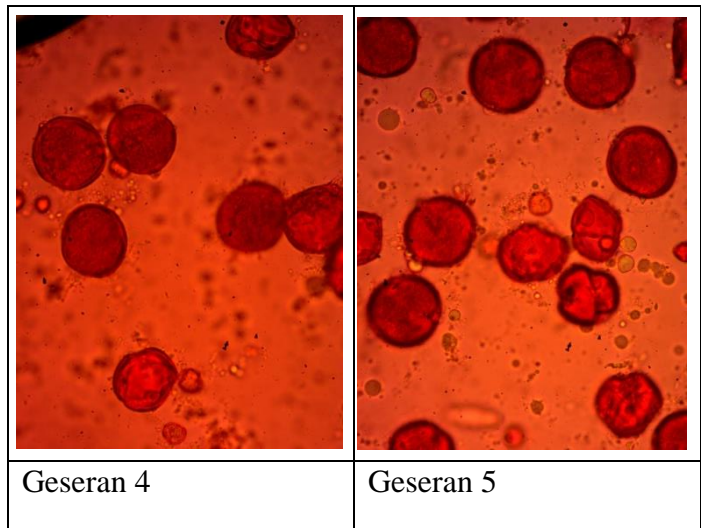
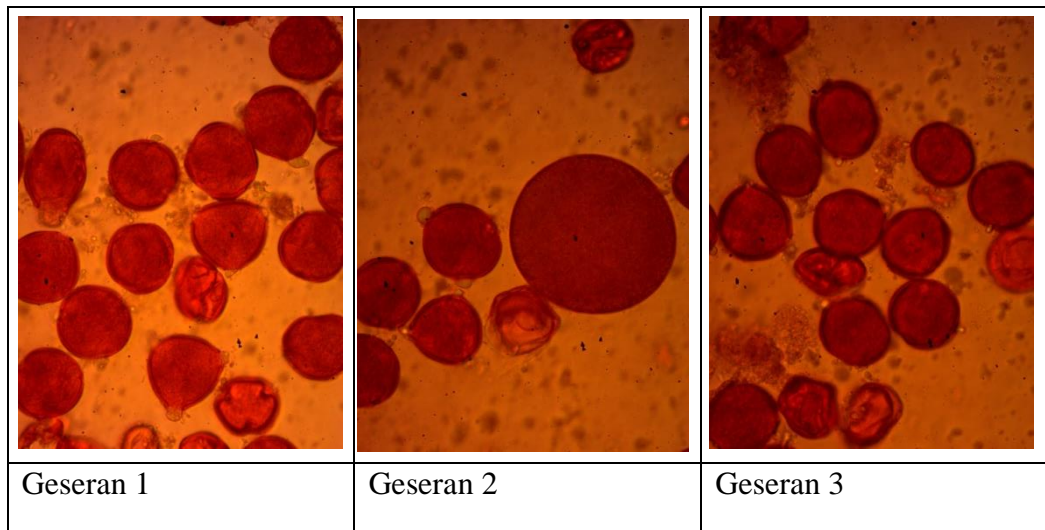


Gambar Polen pada bee bread koloni 3 tahap 1



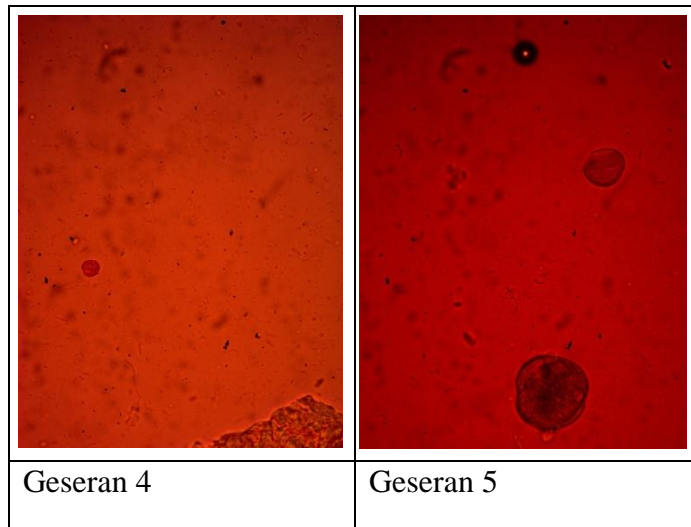
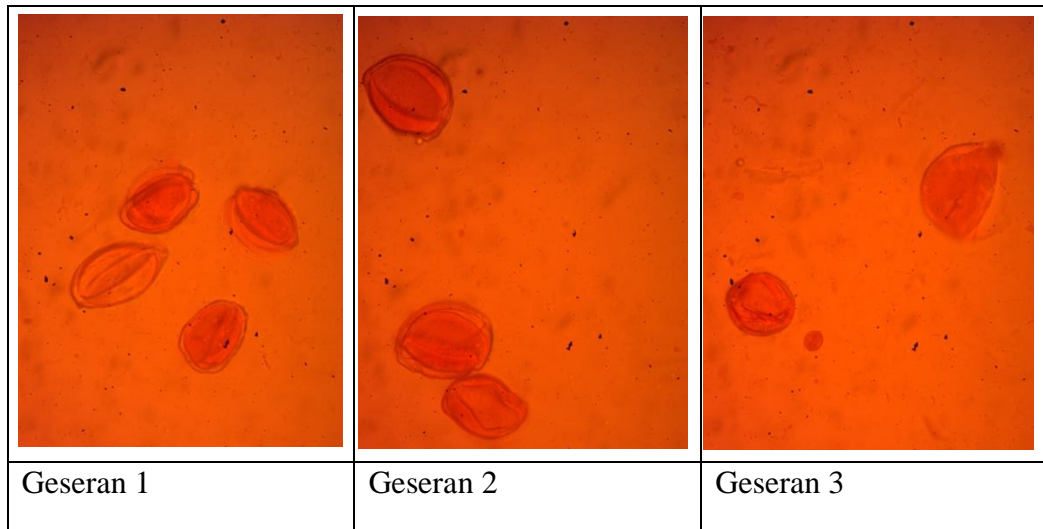


Gambar Polen pada bee bread koloni 3 tahap 2

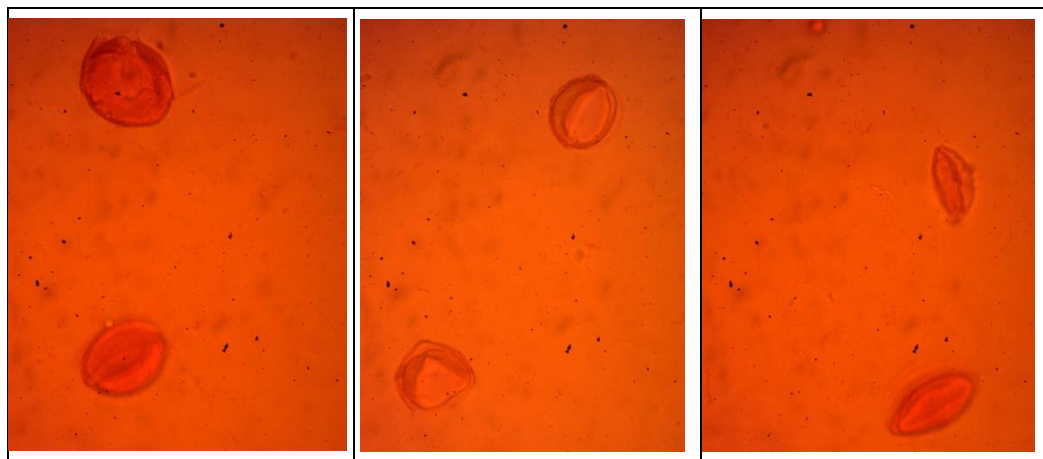


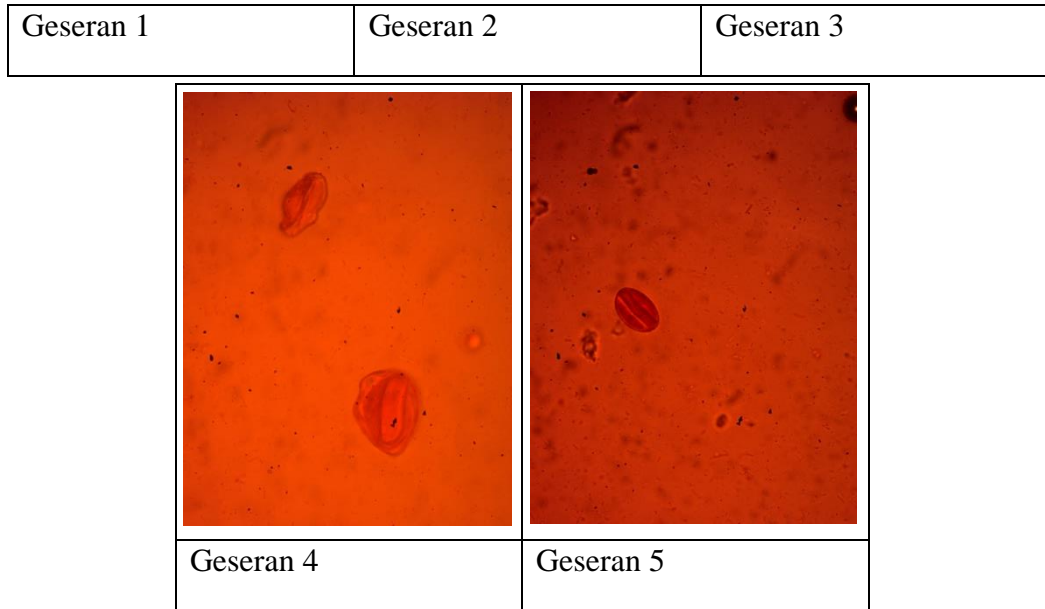
Gambar Polen pada bee bread koloni 3 tahap 3

Lampiran 3. Gambar polen pada madu menggunakan mikroskop dengan perbesaran 40X

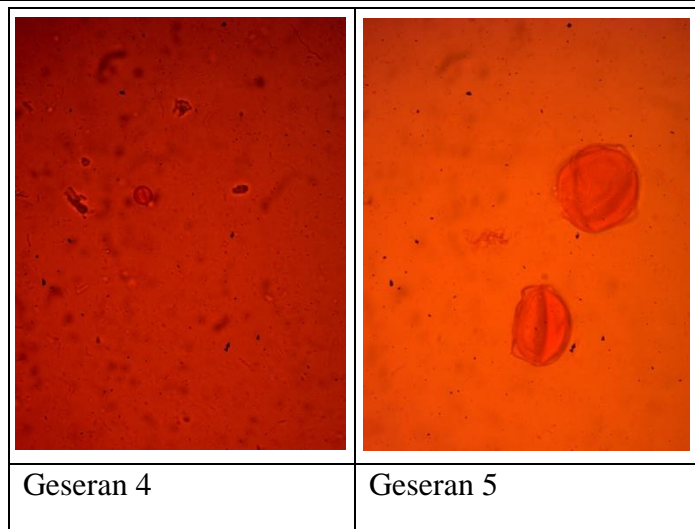
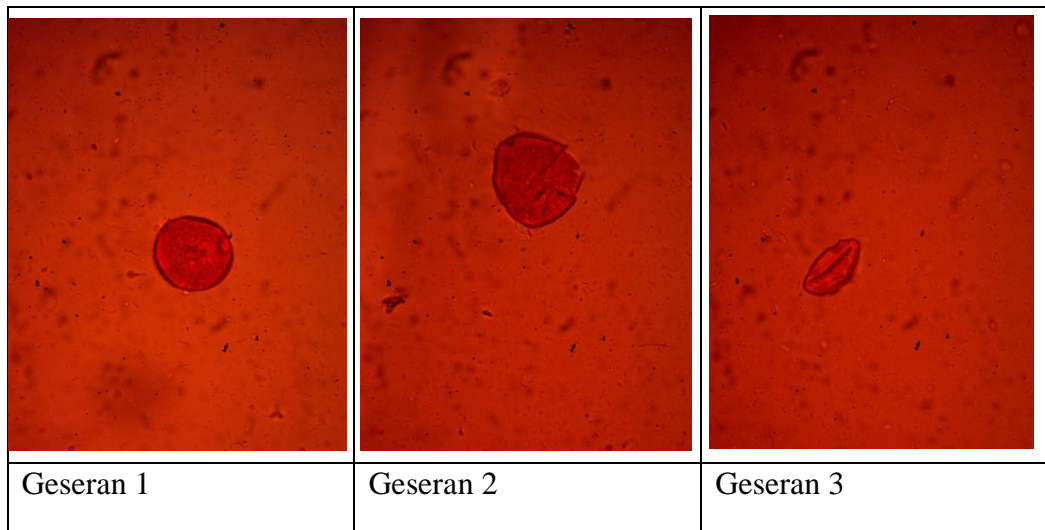


Gambar Polen pada madu koloni 1 tahap 1

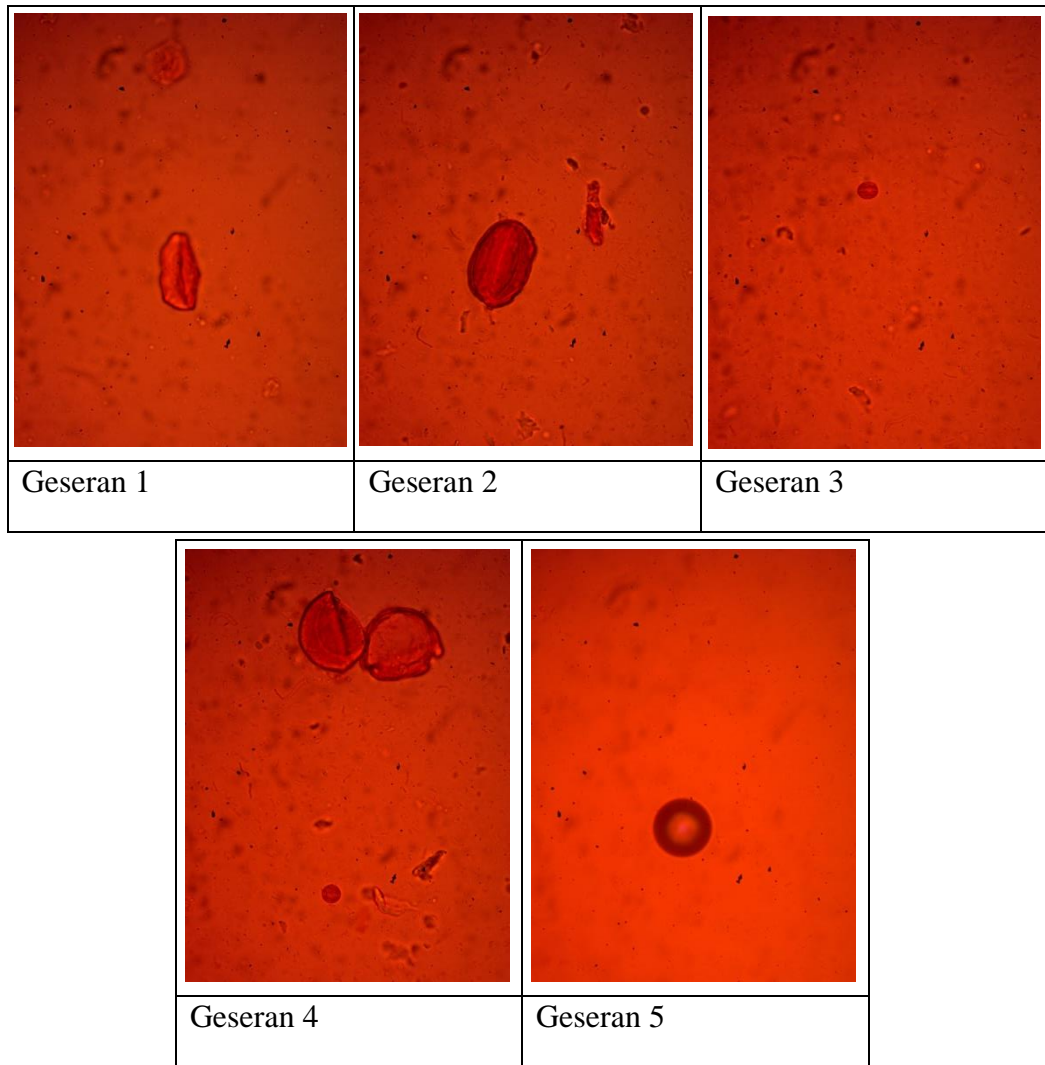




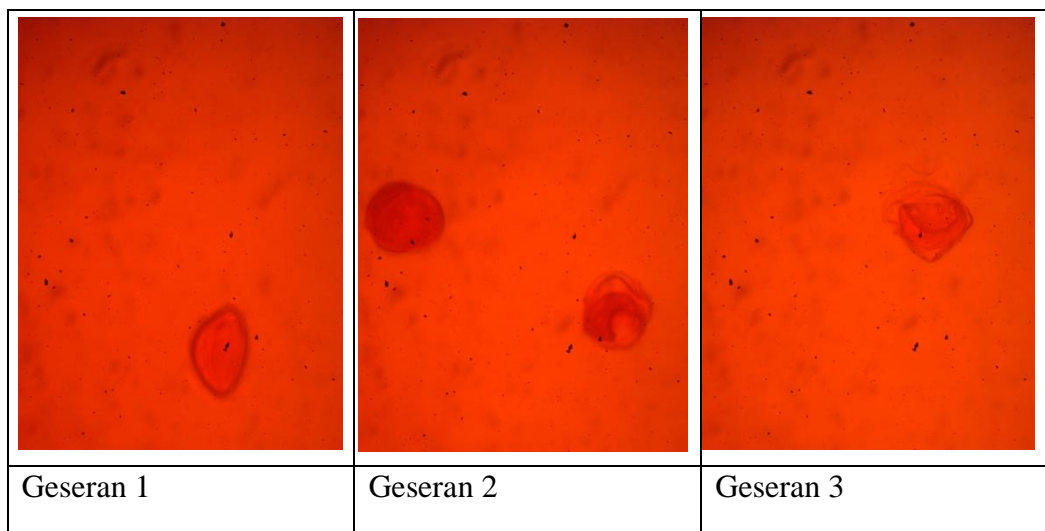
Gambar Polen pada madu koloni 1 tahap 2

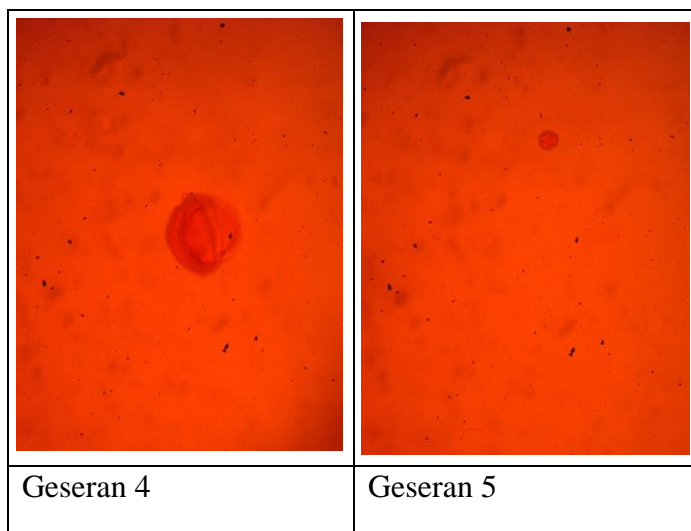


Gambar Polen pada madu koloni 1 tahap 3

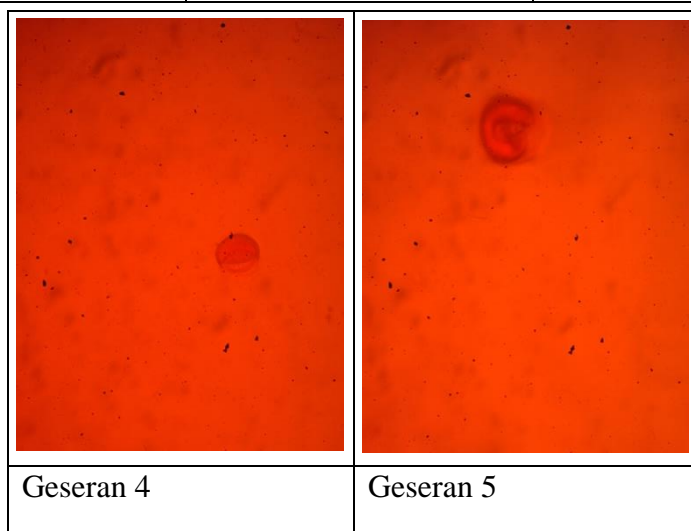
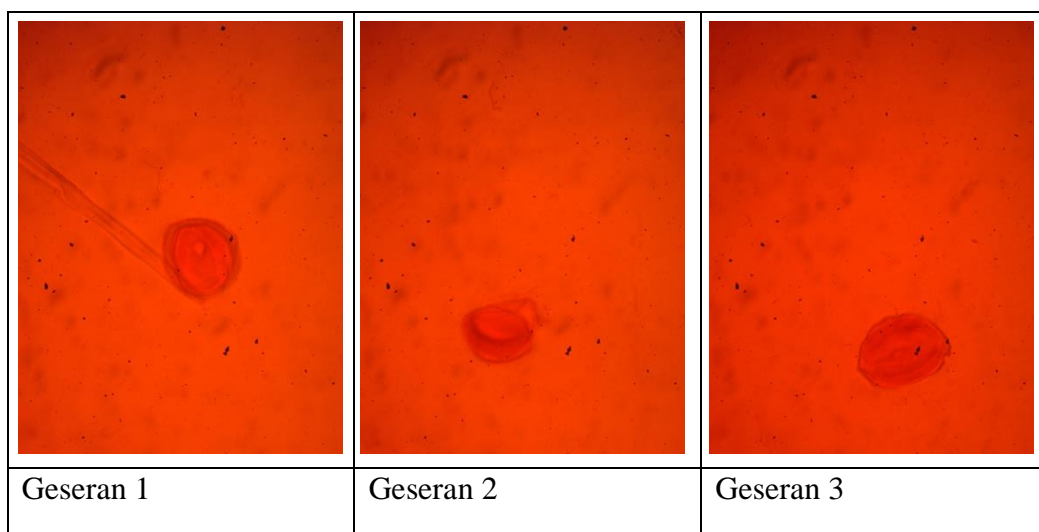


Gambar Polen pada madu koloni 2 tahap 1



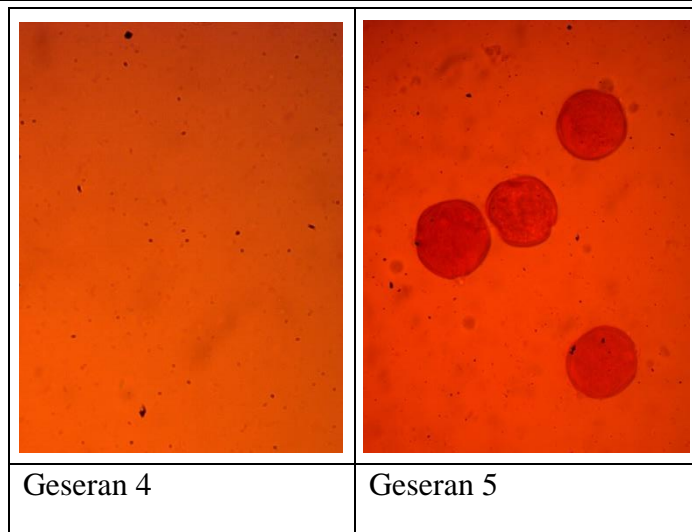
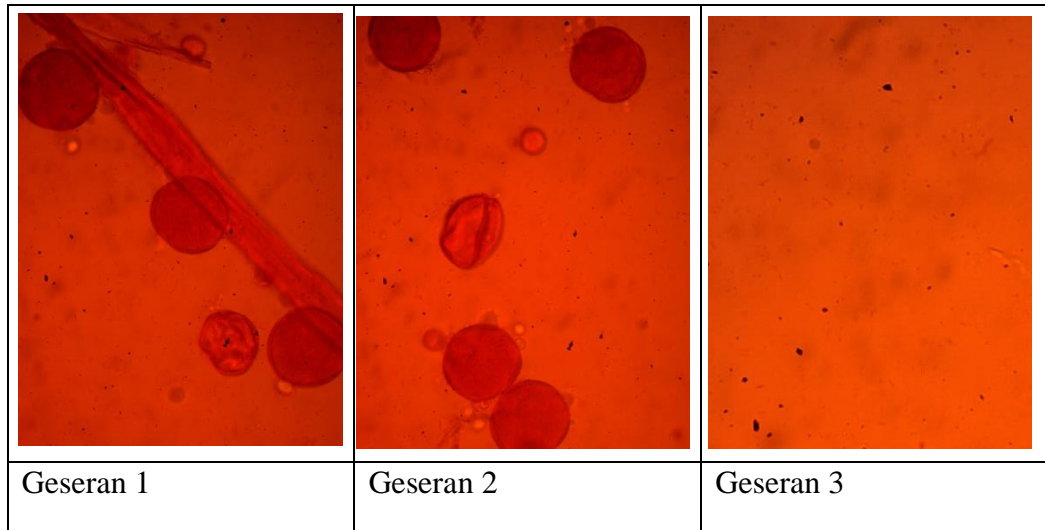


Gambar Polen pada madu koloni 2 tahap 2

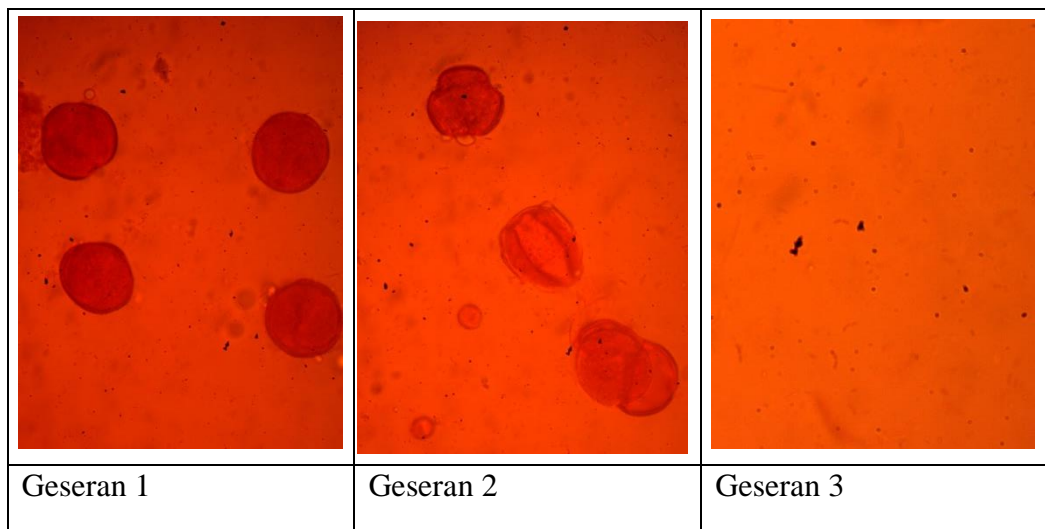


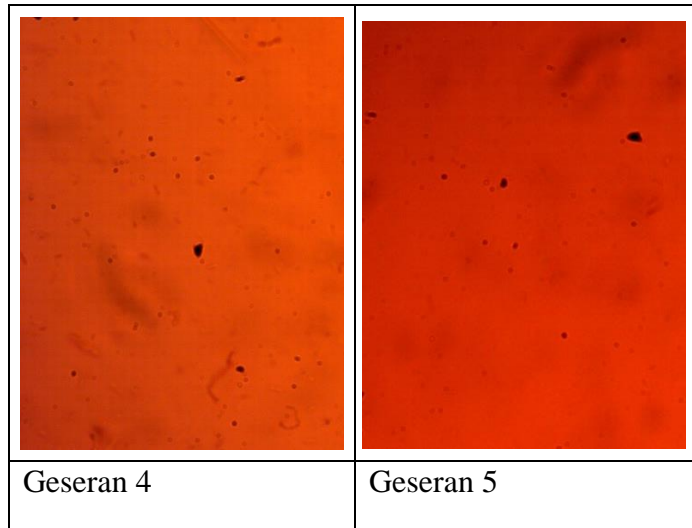
Gambar Polen pada madu koloni 2 tahap 3



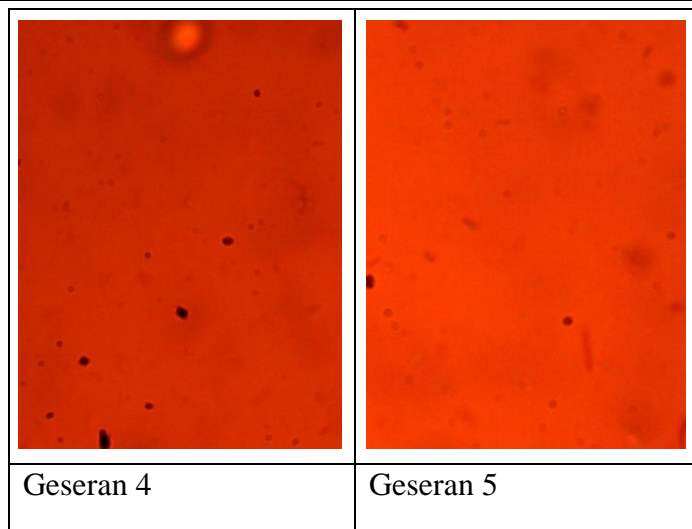
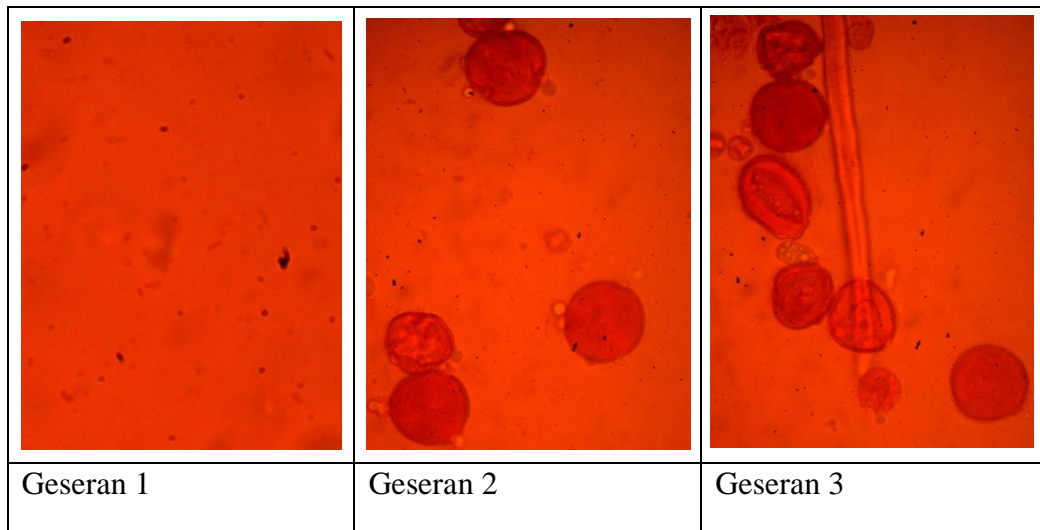


Gambar Polen pada madu koloni 3 tahap 1





Gambar Polen pada madu koloni 3 tahap 2



Gambar Polen pada madu koloni 3 tahap 3

Lampiran 4. Hasil pengamatan, identifikasi dan perhitungan polen pada bee bread

<b>Koloni 1</b>								
Koloni 1	Jenis Polen	G1	G2	G3	G4	G5	Jumlah	%
Tahap 1	Asoka	1		2			3	8.11
	Bawang Dayak		1		1		2	5.41
	Bunga Pkl. 8			1			1	2.70
	Jati	1					1	2.70
	Kelapa	3	8	4	6	7	28	75.68
	Pepaya		1				1	2
Total							37	
Koloni 1	Jenis Polen	G1	G2	G3	G4	G5	Jumlah	%
Tahap 2	Asoka		2	1		1	4	7.69
	Jeruk			1		1	2	3.85
	Kelapa	4	8	11	6	8	37	71.15
	Lamtoro			1			1	1.92
	Matahari					1	1	1.92
	Pepaya	1				1	2	3.85
	Putri Malu					1	1	1.92
	Rambutan			1			1	1.92
	Zinnia Anggun				3		3	5.77
Total							52	
Koloni 1	Jenis Polen	G1	G2	G3	G4	G5	Jumlah	%
Tahap 3	Air Mata Pengantin		1	1			2	3.45
	Bunga Pkl. 8	1					1	1.72
	Kelapa	9	12	8	8	13	50	86.21
	Lamtoro				1		1	1.72
	Matahari					1	1	1.72
	Pepaya		1				1	1.72
	Zinnia Anggun	2					2	3.45
Total							58	

Koloni 2								
Koloni 2	Jenis Polen	G1	G2	G3	G4	G5	Jumlah	%
Tahap 1	Asoka	1					1	2.50
	Bunga Pkl. 8			1			1	2.50
	Jati					1	1	2.50
	Jeruk			1	1		2	5.00
	Kelapa	2		3	7	2	14	35.00
	Lamtoro					1	1	2.50
	Matahari	1	1				2	5.00
	Pepaya			1			1	2.50
	Putri Malu	2	2	4		2	10	25.00
	Rambutan				1		1	2.50
	Bengkire			1		2	3	7.50
	B3	1					1	2.50
	B4					1	1	2.50
	B6		1				1	2.50
Total							40	
Koloni 2	Jenis Polen	G1	G2	G3	G4	G5	Jumlah	%
Tahap 2	Asoka	1				1	2	3.92
	Bawang Dayak		2				2	3.92
	Kelapa	6	4	1	1	4	16	31.37
	Lamtoro					2	2	3.92
	Matahari			1			1	1.96
	Putri Malu	2	1	2	1	2	8	15.69
	Zinnia Anggun					1	1	1.96
	Bengkire	2	2	2	1	5	12	23.53
	B1			1	1	1	3	5.88
	B2				1		1	1.96
	B4				1		1	1.96
	B6	1		1			2	3.92
	Total							51
Koloni 2	Jenis Polen	G1	G2	G3	G4	G5	Jumlah	%
Tahap 3	Air Mata Pengantin				1	1	2	4.17
	Bunga Pkl. 8			1			1	2.08
	Jeruk	1				1	2	4.17
	Kelapa	1	6	4	5	4	20	41.67
	Lamtoro	1	2	1			4	8.33
	Matahari	1					1	2.08
	Putri Malu	1	1			1	3	6.25
	Rambutan				1		1	2.08
	Rumput Pendul		1	1			2	4.17
	Zinnia Anggun					1	1	2.08
	Bengkire	1	1	2		4	8	16.67

	B5			1	1		2	4.17
	B6			1			1	2.08
Total							48	

Koloni 3								
Koloni 3	Jenis Polen	G1	G2	G3	G4	G5	Jumlah	%
Tahap 1	Air Mata Pengantin		1				1	2.08
	Kelapa					1	1	2.08
	Lamtoro	9	5	8	7	5	34	70.83
	Rambutan					1	1	2.08
	Pepaya			2	1		3	6.25
	B5	4	1	1			6	12.50
	B7					2	2	4.17
Total							48	
Koloni 3	Jenis Polen	G1	G2	G3	G4	G5	Jumlah	%
Tahap 2	Air Mata Pengantin					1	1	1.82
	Bunga Pkl. 8				1		1	1.82
	Jeruk	1					1	1.82
	Labu				2		2	3.64
	Lamtoro	8	7	7	6	8	36	65.45
	Pepaya	2		2		1	5	9.09
	Rambutan				2		2	3.64
	B5		1	2	2	2	7	12.73
Total							55	
Koloni 3	Jenis Polen	G1	G2	G3	G4	G5	Jumlah	%
Tahap 3	Air Mata Pengantin		1				1	2.04
	Bunga Pkl. 8	1				2	3	6.12
	Lamtoro	10	4	10	5	6	35	71.43
	Pepaya		1		1		2	4.08
	Rambutan	2					2	4.08
	B5	1		2	1	2	6	12.24
Total							49	

Lampiran 5. Hasil pengamatan, identifikasi dan perhitungan *polen* pada madu

Koloni 1								
Koloni 1	Jenis Polen	G1	G2	G3	G4	G5	Jumlah	%
Tahap 1	Bawang Dayak					1	1	7.69
	Kelapa	4	3	1			8	61.54
	Lamtoro					1	1	7.69
	Putri Malu				1		1	7.69
	Pepaya			1			1	7.69
	Bengkire			1			1	7.69
Total							13	
Koloni 1	Jenis Polen	G6	G7	G8	G9	G10	Jumlah	%
Tahap 2	Asoka			1			1	10
	Jeruk					1	1	10
	Kelapa	2	3	1	2		8	80
	Total							10
Koloni 1	Jenis Polen	G11	G12	G13	G14	G15	Jumlah	%
Tahap 3	Asoka			1			1	20
	Kelapa					2	2	40
	Lamtoro	1					1	20
	Rumput Pendul				1		1	20
Total							5	

Koloni 2								
Koloni 2	Jenis Polen	G1	G2	G3	G4	G5	Jumlah	%
Tahap 1	Kelapa	1	1		2		4	66.67
	Putri Malu				1		1	16.67
	Rumput Pendul			1			1	16.67
	Total							6
Koloni 2	Jenis Polen	G1	G2	G3	G4	G5	Jumlah	%
Tahap 2	Lamtoro		1				1	16.67
	Kelapa	1	1	1	1		4	66.67
	Putri Malu					1	1	16.67
	Total							6
Koloni 2	Jenis Polen	G1	G2	G3	G4	G5	Jumlah	%
Tahap 3	Jeruk				1		1	25
	Kelapa	1	1	1		1	4	80
	Total							5

Koloni 3								
Koloni 3	Jenis Polen	G1	G2	G3	G4	G5	Jumlah	%
Tahap 1	Bawang Dayak		1				1	6.67
	Lamtoro	3	4			4	11	73.33
	Putri Malu		1				1	6.67
	Bengkire		1				1	6.67
	B5	1					1	6.67
	Total							15
Koloni 3	Jenis Polen	G1	G2	G3	G4	G5	Jumlah	%
Tahap 2	Bunga Pkl. 8		1				1	12.50
	Lamtoro	4	1				5	62.50
	Putri Malu		2				2	25.00
	Total							8
Koloni 3	Jenis Polen	G1	G2	G3	G4	G5	Jumlah	%
Tahap 3	Kelapa			1			1	8.33
	Labu			2			2	16.67
	Lamtoro		2	3			5	41.67
	Rambutan		1				1	8.33
	Bengkire			2			2	16.67
	B5		1				1	8.33
	Total							12

Lampiran 6. Hasil rata-rata persentase jenis polen pada *bee bread* setiap koloni

	Jenis Polen	Persentase (%)			Rata-Rata
		Tahap 1	Tahap 2	Tahap 3	
Koloni 1	Asoka	8.11	7.69	0	5.27
	Air Mata Pengantin	0	0	3.45	1.15
	Bawang Dayak	5.41	0	0	1.80
	Bunga Pkl. 8	2.7	0	1.72	1.47
	Jati	2.7	0	0	0.90
	Jeruk	0	3.85	0	1.28
	Kelapa	75.68	71.15	86.21	77.68
	Lamtoro	0	1.92	1.72	1.21
	Matahari	0	1.92	1.72	1.21
	Pepaya	5.41	3.85	1.722	3.66
	Putri Malu	0	1.92	0	0.64
	Rambutan	0	1.92	0	0.64
	Zinnia Anggun		5.77	3.45	4.61

	Jenis Polen	Persentase (%)			Rata-Rata
		Tahap 1	Tahap 2	Tahap 3	
Koloni 2	Asoka	2.5	3.92	0	2.14
	Air Mata Pengantin	0	0	4.17	1.39
	Bawang Dayak	0	2.93	0	0.98
	Bengkire	7.5	23.53	16.67	15.90
	Bunga Pkl. 8	2.5	0	2.08	1.53
	Jati	2.5	0	0	0.83
	Jeruk	5	0	4.17	3.06
	Kelapa	35	31.37	41.67	36.01
	Lamtoro	2.5	3.92	8.33	4.92
	Matahari	5	1.96	2.08	3.01
	Pepaya	2.5	0	0	0.83
	Putri Malu	25	15.69	6.25	15.65
	Rambutan	2.5	0	2.08	1.53
	Rumput Pendul	0	0	4.17	1.39
	Zinnia Anggun	0	1.96	22.08	8.01
	B1	0	5.88	0	1.96
	B2	0	1.96	0	0.65
	B3	2.5	0	0	0.83
	B4	2.5	1.96	0	1.49
	B5	0	0	4.17	1.39
B6	2.5	3.92	2.08	2.83	



	Jenis Polen	Persentase (%)			Rata-Rata
		Tahap 1	Tahap 2	Tahap 3	
Koloni 3	Air Mata Pengantin	2.08	1.82	2.04	1.98
	Bunga Pkl. 8	0	1.82	6.12	2.65
	Jeruk	0	1.82	0	0.61
	Kelapa	2.08	0	0	0.69
	Labu	0	3.63	0	1.21
	Lamtoro	70.83	65.45	71.43	69.24
	Pepaya	6.25	9.09	4.08	6.47
	Rambutan	2.08	3.64	4.08	3.27
	B5	12.5	12.73	12.224	12.48
	B7	4.17	0	0	1.39

Lampiran 7. Hasil rata-rata persentase jenis *polen* tanama pada madu setiap koloni

	Jenis Polen	Persentase (%)			Rata-Rata
		Tahap 1	Tahap 2	Tahap 3	
Koloni 1	Asoka	0	10	20	10
	Bawang Dayak	7.69	0	0	2.56
	Bengkire	7.69	0	0	2.56
	Jeruk	0	10	0	3.33
	Kelapa	61.54	80	40	60.51
	Lamtoro	7.69	0	20	9.23
	Pepaya	7.69	0	0	2.56
	Putri Malu	7.69	0	0	2.56
	Rumput Pendul	0	0	20	6.67

	Jenis Polen	Persentase (%)			Rata-Rata
		Tahap 1	Tahap 2	Tahap 3	
Koloni 2	Jeruk	0	0	25	8.33
	Kelapa	66.67	66.67	80	71.11
	Lamtoro	0	16.67	0	5.56
	Putri Malu	16.67	16.67	0	11.11
	Rumput Pendul	16.67	0	0	5.56

	Jenis Polen	Persentase (%)			Rata-Rata
		Tahap 1	Tahap 2	Tahap 3	
Koloni 3	Bawang Dayak	6.67	0	0	2.22
	Bengkire	6.67	0	16.67	7.78
	Bunga Pkl. 8	0	12.5	0	4.17
	Kelapa	0	0	8.33	2.78
	Labu	0	0	16.67	5.56
	Lamtoro	73.33	62.5	41.67	59.17
	Putri Malu	6.67	25	0	10.56
	Rambutan	0	0	8.33	2.78
	B5	6.67	0	8.33	5

Lampiran 8. Perbandingan persentase rata-rata *polen* tanaman pada *bee bread* dan madu

a. *Bee Bread*

Jenis Polen	Persentase			Rata-rata (%)
	Koloni 1	Koloni 2	Koloni 3	
Asoka	5.27	2.14	0	2.47
Air Mata Pengantin	1.15	1.39	1.98	1.51
Bawang Dayak	1.80	0.98	0	0.93
Bengkire	0.00	15.90	0.00	5.30
Bunga Pkl. 8	1.47	1.53	2.65	1.88
Jati	0.90	0.83	0	0.58
Jeruk	1.28	3.06	0.61	1.65
Kelapa	77.68	36.01	0.69	38.13
Lamtoro	1.21	4.92	69.24	25.12
Labu	0.00	0.00	1.21	0.40
Matahari	1.21	3.01	0.00	1.41
Pepaya	3.66	0.83	6.47	3.66
Putri Malu	0.64	15.65	0.00	5.43
Rambutan	0.64	1.53	3.27	1.81
Rumput Pendul	0.00	1.39	0.00	0.46
Zinnia Anggun	4.61	8.01	0.00	4.21
B1	0.00	1.96	0.00	0.65
B2	0.00	0.65	0.00	0.22
B3	0.00	0.83	0.00	0.28
B4	0.00	1.49	0.00	0.50
B5	0.00	1.39	12.48	4.62
B6	0.00	2.83	0.00	0.94
B7	0.00	0	1.39	0.46

b. Madu

Jenis Polen	Persentase			rata-rata (%)
	Koloni 1	Koloni 2	Koloni 3	
Asoka	10	0	0	3.33
Bawang Dayak	2.56	0	2.22	1.60
Bengkire	2.56	0	7.78	3.45
Bunga Pkl. 8	0	0	4.17	1.39
Jeruk	3.33	8.33	0	3.89
Kelapa	60.51	71.11	2.78	44.80
Labu	0.00	0	5.56	1.85
Lamtoro	9.23	5.56	59.17	24.65
Pepaya	2.56	0	0.00	0.85
Putri Malu	2.56	11.11	10.56	8.08

Rambutan	0.00	0	2.78	0.93
Rumput Pendul	6.67	5.56	0.00	4.07
B5	0.00	0	5	1.67

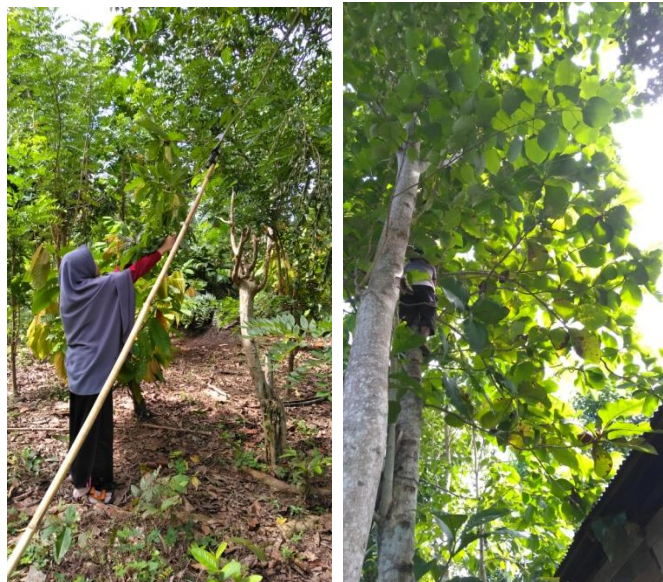
c. Perbandingan Rata-rata Polen pada *Bee Bread* dan Madu

Jenis Polen	<i>Bee Bread</i>	Madu
Asoka	2.47	3.33
Air Mata Pengantin	1.51	0
Bawang Dayak	0.93	1.60
Bengkire	5.30	3.45
Bunga Pkl. 8	1.88	1.39
Jati	0.58	0
Jeruk	1.65	3.89
Kelapa	38.13	44.80
Lamtoro	25.12	24.65
Labu	0.40	1.85
Matahari	1.41	0
Pepaya	2.13	0.85
Putri Malu	5.43	8.08
Rambutan	1.81	0.93
Rumput Pendul	0.46	4.07
Zinnia Anggun	4.21	0
B1	0.65	0
B2	0.22	0
B3	0.28	0
B4	0.50	0
B5	4.62	1.67
B6	0.94	0
B7	0.70	0

Lampiran 9. Dokumentasi pengambilan sampel di lapangan

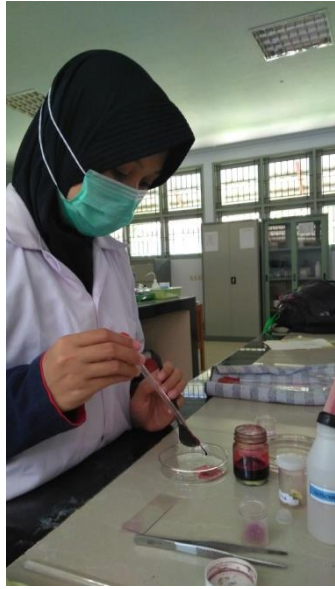


(Pengambilan sampel madu dan *bee bread* dari kotak sarang lebah)

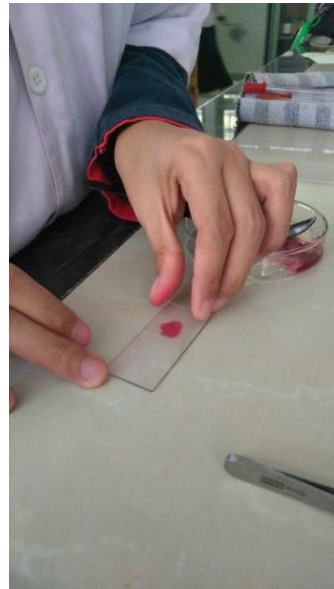


(Pengambilan sampel bunga disekitar lokasi peternakan lebah)

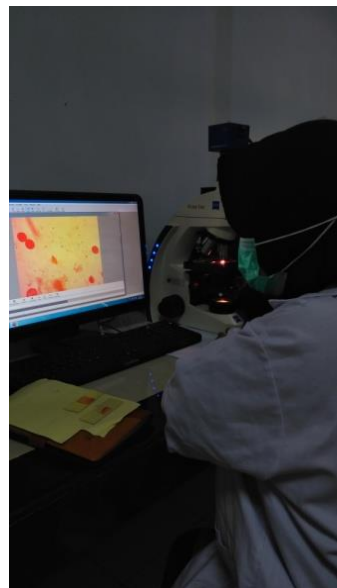
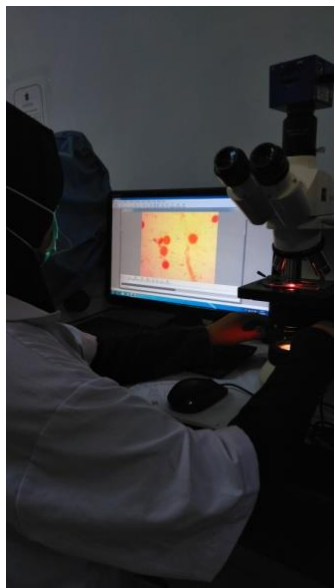
Lampiran 10. Dokumentasi Identifikasi Polen di laboratorium



(Pewarnaan sampel dengan safranin)



( Meletakkan sampel pada *objek glass*)



(Pengamatan dan Identifikasi Polen menggunakan mikroskop)



(Sampel Bunga, Madu, dan *Bee Bread*)