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LAMPIRAN

Lampiran 1. Glosarium

Contorted: Berkerut

Discoid: Bundar atau pipih; menyerupai cakram

Flabellate: Berbentuk kipas; segmen rata dan memanjang di satu sisi

Heart-shaped: Berbentuk hati

Lobed: Segmen yang memiliki tepian dipotong membentuk divisi bulat

Morphotype: Variasi morfologi dalam populasi spesies

Ovate: Oval, bulat seperti telur

Plane: Bidang; datar

Slightly ribbed: Sedikit bergaris

Subglobular: Bentuk yang tidak cukup untuk dikatakan globe

Trilobed: Berlobus tiga

Undulating: Berombak-ombak

Lampiran 2. Kunci determinasi spesies *Halimeda* di Indo-Pasifik oleh (Hillis & Colinvaux, 1980)

1. Plants growing in sand or other loose substrates; *holdfast* usually well developed, rarely less than 1 cm long and frequently massive 2
1. Plants generally attached to rock, or if associated with sand lacking a well-developed bulbous *holdfast*; *holdfast* rarely exceeding 1 cm in length, although sometimes it may spread laterally to this size or somewhat larger; more than one *holdfast* region may be present 10
2. Segments large, broad, flat, to 29 mm long and 40 mm broad 3
2. Segments smaller, flat or cylindrical, to 12 mm long and 16 mm broad (excluding basal or fusion segments) 5
3. Segments predominantly large, subcuneate to reniform and little lobed, to 29 mm long, 40 mm broad; fan-shaped basal or suprabasal segment absent; *peripheral utricle*s sometimes separate and round ..... *H. macroloba*
3. Segments rarely exceeding 12 mm long and 17 mm broad, margins often crenulated or lobed; if *peripheral utricle*s separate on decalcification they remain *hexagonal* 4
4. Fan-shaped basal or suprabasal segment present; plant heavy-set and somewhat squat with predominantly broad, reniform or ovate segments with crenulated margins, to 12 mm long, 17 mm broad... *H. borneensis*

4. Fan-shaped basal or suprabasal segment absent; basal portion of plant of two to three cylindrical to subcuneate or at times reniform segments, the upper one supporting several subcuneate segments which are often arranged in an imbricated fashion, or sometimes a stalk region present which has developed from the fusion of small adjacent segments; segments to 11 mm long, 15 mm broad, margins sometimes shallowly trilobed or undulating but usually not crenulated ..... *H. simulans*

5. Segment surface appearing pitted when viewed macroscopically; *peripheral utricle*s generally exceeding 110 µm in surface diameter .... *H. favulosa*

5. Segment surface not appearing pitted when viewed macroscopically; *peripheral utricle*s generally less than 100 µm in surface diameter 6

6. Segments of the upper half of the plant, except those supporting branches, predominantly cylindrical, their length usually at least three to four times their diameter 7
6. Segments of the upper half of the plant flat, or if cylindrical the length usually not more than twice their diameter 8
7. Diameter of the cylindrical segments remaining fairly constant from base to apex of the plant and averaging 1.0-1.5 mm; stalk of thallus short, of one to two segments; plant of Atlantic distribution..... *H. monile*
7. Diameter of the cylindrical segments decreasing from base to apex of the plant, averaging 3-4 mm near the base, and 1.0-1.5 mm towards the apex; caulescent, or in older plants a number of these cauline structures may be consolidated laterally into a basal fanshaped structure ; of Indo-Pacific distribution..... *H. cylindracea*
8. Plants thick-set in appearance, the segments averaging 2 mm in thickness ; segments subcuneate to cylindrical, often becoming subspherical towards the plant apex ..... *H. stuposa*

8. Plants not appearing thick-set, segments (excluding the basal ones) averaging 0.75-1.00 mm in thickness; segments generally subcuneate to reniform 9
9. *Peripheral utricle*s generally 50 µm or less in surface diameter; segments predominantly subcuneate to reniform with outer margin entire to shallowly lobed; basal portion of plant commonly of two to three cylindrical to subcuneate or at times reniform segments, the upper one supporting several subcuneate often in an imbricated arrangement; plants to 10 cm tall ..... *H. simulans*
9. *Peripheral utricle*s generally exceeding 50 pm in surface diameter; segments cylindrical to cuneate to discoidal and reniform with the outer margin often deeply lobed; plants to 24 cm tall ..... *H. incrassata*

10. Basal *holdfast* region appearing to involve several of the lowermost segments which consequently may be obscured by particles of sand adhering to the rhizoidal filaments of the region; entire *holdfast* area may spread laterally for 1 cm or more 11

10. Basal *holdfast* region restricted to a single segment, *holdfast* ranging from relatively conspicuous and about 1 cm in greatest dimension to almost negligible, any adhering particles of loose substrate usually can be scraped away readily to show a localized *holdfast* 12
11. Area of basal segments of thallus generally two or more times larger than those of rest of thallus so that a pronounced stalked effect is produced ..... *H. melanesica*
11. Segments of fairly uniform size (area) throughout, with maximum size approximately 4 mm long, 5 mm broad ..... *H. renschii*
12. Growth pattern often forming laterally spreading thalli to 25 m or more which may be accompanied by some erect growth, or growth pattern mostly erect producing densely branched clumps; branching often multidirectional so that thallus does not lie flat; *holdfast* attachment generally in several places rather than by a single basal *holdfast* attachment although these small attachments may be lost duriing collecting 13
12. Other than the above 15
13. Branching commonly in one plane so that thallus lies relatively flat; segments generally flat but sometimes arched, commonly white, glossy, broadly subcuneate, sometimes trilobed; *cortex* generally of two layers of *utricle*s with secondary *utricle*s slightly to distinctly clavate at apical end; secondary *utricle*s supporting four to eight *peripheral utricle*s ..... *H. gracilis*
13. Branching commonly multidirectional so that thallus does not lie flat; segments flat or contorted, their surfaces dull; *cortex* generally of three or more series of *utricle*s which are not expanded at the apical end and which bear only four *peripheral utricle*s at most 14
14. Segments relatively large, to 16 mm long, 19 mm broad; often contorted; *peripheral utricle*s measuring 36-60 µm in surface diameter ..... *H. distorta*
14. Segments smaller, plane or somewhat contorted, to approximately 7 mm long, 11 mm broad; *peripheral utricle*s measuring 12-41 µm in surface diameter ..... *H. opuntia*
15. Basal segment flabellate, to approximately 12 mm long, 18 mm broad, supporting numerous branches ..... *H. micronesica*
15. Basal segment not flabellate 16

16. A small “cushion” segment to 1.5 mm long, 5.5 mm broad inter posed between some or all of the segments ..... *H. cuneata*

16. Small “cushion” segments absent 17
17. Mature plants small, not exceeding 5 cm in length; the segments of at least the upper half of the plant spherical or tear-shaped, to 5 mm long, 5 mm broad and 5 mm thickness; secondary *utricle*s capitate, supporting 6-18 *peripheral utricle*s ..... *H. lacrimosa*
17. Mature plants larger; segments flat or somewhat contorted but not spherical 18
18. Average surface diameter of the *peripheral utricle*s exceeding 120 µm 19
18. Average surface diameter of the *peripheral utricle*s less than 120 µm 20
19. Segments large, to 31 mm long, 42 mm broad, not friable; colour on drying brownish green; calcification rather light ..... *H. gigas*
19. Segments smaller, to 15 mm long, 24 mm broad, friable; colour on drying white or pale greenish white; calcification moderate .... *H. macrophysa*
20. *Peripheral utricle*s each projecting into a central spine ..... *H. scabra*
20. *Peripheral utricle*s with smooth outer surface 21
21. Node consisting of a single *medulla*ry filament ..... *H. cryptica*
21. Node consisting of several to many *medulla*ry filaments 22
22. Secondary *utricle*s noticeably inflated, generally exceeding 90 µm in diameter ..... *H. discoidea*
22. Secondary *utricle*s less than 90 pm in diameter 23
23. Tertiary *utricle*s averaging 110 pm or more in diameter, with length two to three or more times the diameter ..... *H. taenicola*
23. Tertiary *utricle*s averaging less than 110 µm in diameter and length not more than twice the diameter of the *utricle*s 24
24. Diameters of secondary and tertiary *utricle*s swollen in comparison to diameters of *medulla*ry filaments, *utricle*s noticeably contracted at their bases 25
24. Diameters of secondary and tertiary *utricle*s not appreciably greater than diameters of *medulla*ry filaments, secondary and tertiary *utricle*s not conspicuously contracted at their bases 26
25. Segments predominantly subcuneate to obovate; *peripheral utricle*s generally 50 µm or less in surface diameter; nodal units fusing completely in twos and threes; units entangled and adhering strongly for 80-150(-280) µm ..... *H. lacunalis*

26. Nodal filaments remaining separate although adjacent filaments may adhere slightly ..... *H. fragilis*
26. Nodal filaments fusing in small groups although the occasional filament may remain separate 27
27. Mature thalli relatively small, usually 13 cm or less in length; segments also relatively small, with length usually less than 6 mm, width usually less than 11 mm 29
27. Mature thalli larger, generally exceeding 13 cm in length; segments also larger with length to approximately 16 mm, width to about 25 mm 28
28. Plants to about 20 cm tall, generally growing erect, thallus somewhat heavy-set; nodal fusions mostly in twos or threes, the fusions within the units being for a short distance or complete ..... *H. bikinensis*
28. Plants to 70 cm long although they may be considerably shorter, frequently pendant from rock, branches relatively long and somewhat sparse so that overall appearance of thallus is of

delicacy; nodal filaments most commonly fusing in small groups for a short distance only ..... *H. copiosa*

29. Segments predominantly slightly reniform or transversely oval; average diameter of *peripheral utricle*s in surface view about 16 µm or less ..... *H. velasquezii*

29. Segments predominantly other shapes, average diameter of peripherd *utricle*s in surface view 22 µm or greater 30

30. Segments generally longer than broad, except for those bearing branches; segments in upper part of plant flattened-cylindrical to cylindrical; plants often bushy and in shallow water tending to grow erect; nodal fusion mostly in pairs but also in threes with filaments occasionally separate; of Indo-Pacific distribution ..... *H. minima*

30. Segment length generally equalling width or somewhat broader in upper part of thallus; plant growth form somewhat pendant; fusion units of nodal filaments in pairs; of Atlantic distribution ..... *H. goreauii*

Lampiran 3. Dokumentasi kegiatan penelitian di lapangan

Pembuatan label sampel *Halimeda*

Pengambilan sampel *Halimeda*

Lampiran 4. Dokumentasi kegiatan penelitian di Laboratorium

Pengukuran segmen *Halimeda* di Laboratorium

Pengamatan dan pengukuran utricle dan permukaannya untuk mengidentifikasi sampel *Halimeda* secara anatomi.