

An Introduction to Biological Descriptions

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TDWG2008 Fremantle, Western Australia

Biodiversity
Information
Standards
T D W G

The currency of biodiversity data:

- Taxa
- Specimens and observations
- Descriptions
- Images

Types of descriptive data:

- Natural-language descriptions
- Other taxon-descriptive notes
- Identification keys
- Data matrices (e.g. Lucid, DELTA, NEXUS)

Highly unstructured $\xrightarrow{\text{Semi-structured}}$ Highly structured

Unstructured:

<Description>Trees or shrubs, some with prostrate stems. Leaves alternate, sometimes whorled. Flowers many in a dense cylindrical, ovoid or spherical inflorescence, in 3 species reduced and head-like, with a basal involucre of narrow, usually hairy bracts that commonly fall by anthesis; flowers in pairs, each flower subtended by a bract and each pair by a larger 'common bract'. Perianth of 4 ±equal tepals. Pistil usually wiry; pollen presenter scarcely delimited to markedly modified, commonly ribbed. Ovules 2. Fruit a woody follicle. Seeds 1 or 2, with an intermediary 2-winged plate of similar outline and size. Cotyledons with acute basal auricles.</Description>

Semi-structured:

<Description><Habit>Trees or shrubs, some with prostrate stems.**</Habit> <Leaves>**Leaves alternate, sometimes whorled.**</Leaves> <Flowers>**Flowers many in a dense cylindrical, ovoid or spherical inflorescence, in 3 species reduced and head-like, with a basal involucre of narrow, usually hairy bracts that commonly fall by anthesis; flowers in pairs, each flower subtended by a bract and each pair by a larger 'common bract'. Perianth of 4 ±equal tepals. Pistil usually wiry; pollen presenter scarcely delimited to markedly modified, commonly ribbed. Ovules 2. **</Flowers><Fruit>**Fruit a woody follicle. Seeds 1 or 2, with an intermediary 2-winged plate of similar outline and size. **</Fruit> <Cotyledons>**Cotyledons with acute basal auricles. **</Cotyledons></Description>**

Structured:

Flowers		Hibbertia acerosa	Hibbertia acrotrichion	Hibbertia amplexicaulis	Hibbertia ancistrophylla	Hibbertia ancistrotricha	Hibbertia andrewsiana	Hibbertia arcuata	Hibbertia argentea	Hibbertia aurea	Hibbertia avonensis	Hibbertia axillibarba	Hibbertia carinata	Hibbertia charlesii	Hibbertia chartacea	Hibbertia commutata	Hibbertia conspicua
Peduncles	absent or very short		✓		✓			✓	✓	✓		✓	✓	✓	✓	✓	
	present	✓		✓	✓	✓	✓				✓						✓
Floral bracts	conspicuous, broad, brown		✓	✓					✓							✓	✓
	inconspicuous or leaf-like	✓			✓	✓	✓	✓		✓	✓	✓	✓	✓			✓

Curiously semi-structured:

Key to the genus *Hibbertia* in Western Australia

1. Stamens all on one side of 2 carpels (sometimes some staminodes occur opposite the stamens)
 2. Flowers in a several-flowered spike
 3. Sepals, bracts and young leaves glabrous or with minute stellate and hooked hairs **H. spicata**
 3. Sepals, bracts and young leaves with fairly long coarse simple hairs, sometimes also with underlying minute stellate hairs
 4. Hairs white. Stamens few (8–10) in few rows **H. polystachya**
 4. Hairs brownish. Stamens many (28–43) in several rows (Kimberley region only) **H. ledifolia**
 2. Flowers solitary or clustered in the leaf axils
 5. Flowers stalked
 6. Carpels hairy or scaly
 7. Leaves strongly pungent or gradually tapered and spine-tipped
 8. Sepals with scales or scale-like stellate hairs
 9. Leaf with recurved spiny tip **H. eatoniae**
 9. Leaf with straight spiny tip
 10. Flowers 8–15 mm diam. Upper leaf surface smooth **H. lepidocalyx** subsp. **lepidocalyx**
 10. Flowers 15–25 mm diam. Upper leaf surface tuberculate **H. lepidocalyx** subsp. **tuberculata**

SDD (Structure of Descriptive Data) Design Brief

- Exchange standard (DELTA, Lucid etc)
- Superset of all prior “standards”
- Capture all forms of descriptive data
- Support progressive increase in structure
- XML Schema

Capturing structure in descriptive data

An SDD instance document comprises:

- An ontology
- A set of objects to describe
- Markup



Progressive markup

<Description>Trees or shrubs, some with prostrate stems. Leaves simple, alternate, sometimes whorled. Flowers many in a dense cylindrical, ovoid or spherical inflorescence, in 3 species reduced and head-like, with a basal involucre of narrow, usually hairy bracts that commonly fall by anthesis; flowers in pairs, each flower subtended by a bract and each pair by a larger 'common bract'. Perianth of 4 ±equal tepals. Pistil usually wiry; pollen presenter scarcely delimited to markedly modified, commonly ribbed. Ovules 2. Fruit a woody follicle. Seeds 1 or 2, with an intermediary 2-winged plate of similar outline and size. Cotyledons with acute basal auricles.</Description>

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Progressive markup

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SDD Futures – Natural-language processing

You are mistaken, Mr. Darcy, if you supposed that the mode of your declaration affected me in any other way, than as it spared the concern which I might have felt in refusing you, had you behaved in a more gentlemanlike manner.

SDD Futures – Natural-language processing

Leaves ovate to ovate-elliptic, 2-5 cm long, acute, serrate; stipules present, narrowly triangular. Flowers 5-partite, rotate, blue with white spots; corolla lobes narrowly ovate; stamens 5 with a prominent dark gland on the connective.

Support for automated markup

SDD Futures – From exchange standard to collaboration platform

There is a great need for standardised ontologies (characters/states) throughout life.

- Rigorous definitions
- Normativity
- Collaboration platform support



Thanks

The TDWG SDD standard is a collaboration that has involved many people over many years. Principal Working Group leaders are Gregor Hagedorn and Bob Morris

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