

### 3. Key to South African Ophiuroidea

This dichotomous key requires a basic knowledge of ophiuroid taxonomy, which can be gained using the instructions above. Each pair of statements or 'couplet' provides alternate descriptions of some characteristic of the specimen being identified. Choose the statement that closest describes the character of the specimen in question and this leads you to another numbered couplet, where another choice is made, until eventually an identification is arrived at. Reference figures are provided for each species in the main guide and once you have arrived at an identification using the key you should check that the specimen corresponds to the diagnosis and figure of that species in the main guide. It should be noted that this key cannot reliably be used for species found outside South Africa.

A full checklist of all species occurring in South Africa is available at the end of the guide.

1. Disc and arms covered in thick skin .....2  
– Disc and arms covered in thin skin .....21
2. Arms always simple .....3  
– Arms branched .....9
3. Skin concealing radial shields .....16  
– Skin covered but radial shields distinct .....4
4. Radial shields narrow or bar-like .....5  
– Radial shields broad, may be tapering .....*Asteromorpha capensis* (Fig. 27)
5. Disc and radial shields naked .....*Asteronyx loveni* (Fig. 23)  
– Disc and radial shields with armament .....6
6. Disc or radial shields armed with low tubercles / granules / warts .....7  
– Disc or radial shields armed with stumps .....8
7. Disc and arms covered in coarse and fine granules intermixed .....  
.....*Astrothorax papillatus* (Fig. 45)  
– Disc and arms covered in low minute granules ...*Asteroschema salix* (Fig. 25)
8. One pair of stumps per arm segment .....*Astroceras spinigerum* (Fig. 31)  
– More than two stumps per arm segment ...*Asterostegus tuberculatus* (Fig. 29)
9. Madreporites five, deep in interradius ...*Astroglymma cf. sculptum* (Fig. 43)  
– Madreporites less than five, indistinct .....10
10. Oral papillae in distal notches .....11  
– Oral papillae absent in distal notches .....13
11. Dorsal arms armed with tubercles .....12  
– Dorsal arms smooth, with flat platelets .....*Astrocladus africanus* (Fig. 35)

12.	Arm armament fine and smooth .....	<b><i>Astrodendrum capensis</i></b> (Fig. 41)	
-	Arm armament distinct, variable in size surrounded by dark rings .....	<b><i>Astrocladus euryale</i></b> (Fig. 37)	
13.	Arm spines begin after at least second fork .....		14
-	Arm spines begin before first fork .....		15
14.	Belt of hooks complete from fifth fork .....	<b><i>Astrocladus hirtus</i></b> (Fig. 39)	
-	Belt of hooks complete from third fork .....	<b><i>Astroboa nuda</i></b> (Fig. 33)	
15.	Papillae on genital slits in series with papillae of oral area; no gap in tubercles between radial shields and disc ...	<b><i>Gorgonocephalus chilensis</i></b> (Fig. 47)	
-	Papillae on genital slits randomly spaced / placed, distinct gaps in tubercles between radial shields and disc ...	<b><i>Gorgonocephalus pustulatum</i></b> (Fig. 49)	
16.	Oral papillae broad, serrated, flattened .....		17
-	Oral papillae spiniform .....		19
17.	Arm spines slender and serrated .....		18
-	Arm spines long, with lowermost club- or cigar-shaped .....		20
18.	Two arm spines on segments 3–4 .....	<b><i>Ophiomyxa australis</i></b> (Fig. 141)	
-	One arm spine on segments 3–4 ...	<b><i>Ophiomyxa vivipara capensis</i></b> (Fig. 147)	
19.	Second oral tentacle pore outside oral slit .....	<b><i>Ophioscolex inermis</i></b> (Fig. 91)	
-	Second oral tentacle pore inside oral slit .....	<b><i>Ophiolycus dentatus</i></b> (Fig. 89)	
20.	Dorsal arm plates fragmented .....	<b><i>Ophiomyxa tenuispina</i></b> (Fig. 145)	
-	Dorsal arm plates not fragmented .....	<b><i>Ophiomyxa bengalensis</i></b> (Fig. 143)	
21.	Single, pointed apical papilla .....		22
-	No apical papilla, or if present then not pointed .....		37
22.	Radial shields not naked, or only partly naked .....		23
-	Radial shields naked .....		29
23.	Jaws granulated .....	<b><i>Ophiolimna perfida</i></b> (Fig. 109)	
-	Jaws not granulated .....		24
24.	Two tentacle scales distally .....		25
-	One tentacle scale distally .....		26
25.	Disc covered in dense spines only .....	<b><i>Ophiotreta matura</i></b> (Fig. 99)	
-	Disc covered in granules, sometimes with interspersed spines .....	<b><i>Ophiotreta durbanensis</i></b> (Fig. 97)	
26.	Arms moniliform .....	<b><i>Ophiacantha baccata</i></b> (Fig. 101)	
-	Arms not moniliform .....		27

27.	Ventral arm plates fan-shaped .....	28
–	Ventral arm plates pentagonal, distal edge straight .....	
	..... <b><i>Ophiacantha nerthepsila</i></b> (Fig. 103)	
28.	Ventral and lateral arm plates with concentric striations .....	
	..... <b><i>Ophiacantha scutigera</i></b> (Fig. 105)	
–	All arm plates with concentric striations .....	
	..... <b><i>Ophiacantha striolata</i></b> (Fig. 107)	
29.	Dorsal arm plates contiguous on the proximal arm .....	
	..... <b>'Ophiophthalmus' relictus</b> (Fig. 115)	
–	Dorsal arm plates not contiguous proximally .....	30
30.	Ventral interradiial areas with no armament .....	33
–	Ventral interradiial areas with armament (granules, stumps and/or spines)...	31
31.	Oral shields triangular or heart-shaped .....	32
–	Oral shields diamond-shaped, wider than long .....	
	..... <b><i>Ophiothamnus remotus</i></b> (Fig. 247)	
32.	Arm spines exceeding segment length, jaws sunken .....	
	..... <b><i>Ophiomitrella corynephora</i></b> (Fig. 111)	
–	Arm spines not exceeding segment length, jaws flat .....	
	..... <b><i>Ophiomitrella hamata</i></b> (Fig. 113)	
33.	Arm spines four, smooth .....	34
–	Arm spines seven, thorny, lowermost shortest .....	36
34.	Six arms .....	<b><i>Ophioplinthaca sexradia</i></b> (Fig. 121)
–	Five arms .....	35
35.	Oral shields spearhead-shaped, with distinct lobe, much wider than long; tentacle scales 5–6, spinose; dorsal arm plates triangular, as long as wide, not contiguous .....	<b><i>Ophiotoma</i> cf. <i>gracilis</i></b> (Fig. 95)
–	Oral shields D-shaped with slight lobe; tentacle scales needle-like or round, small if not absent; dorsal arm plates triangular to bell-shaped, twice as wide as long .....	<b><i>Ophiotoma</i> cf. <i>alberti</i></b> (Fig. 93)
36.	Disc margin may have scattered spines; radial shields only just contiguous distally if at all; tentacle scales large, flat, pointed .....	..... <b><i>Ophioplinthaca papillosa</i></b> (Fig. 117)
–	Disc margin spines absent; radial shields not contiguous; tentacle scales large, thick and pointed .....	<b><i>Ophioplinthaca rudis</i></b> (Fig. 119)
37.	Pair of symmetrical papillae at apex of each jaw .....	40
–	Multiple or single apical papillae, rarely two, but if so papillae asymmetrical ...	38
38.	Oral papillae fused, forming a serrated flange .....	
	..... <b><i>Ophiodaphne scripta</i></b> (Fig. 241)	
–	Oral papillae not fused .....	39

39. Apical papillae symmetrical, offset laterally ... ***Amphilepis scutata*** (Fig. 245)  
 – Apical papillae may be present, if a pair then asymmetrical .....61
40. Basal arm spines form a flange .....41  
 – Basal arm spines do not form a flange .....42
41. All segments which border genital slits have fused arm spines (except lowest arm spine) forming curved flange on each side of arm .....  
 ..... ***Amphylimna cribriformis*** (Fig. 187)  
 – On first segment, two lowest arm spines each side of arm unmodified, but upper spines flattened and fused, forming curved flange which borders genital slits ..... ***Amphylimna valida*** (Fig. 189)
42. Four oral papillae .....43  
 – One to three oral papillae .....46
43. Four oral papillae with a gap between infradental papillae and second oral papillae revealing second oral tentacle scale, which is in series .....  
 ..... ***Amphioplus (Amphioplus) pectinatus*** (Fig. 203)  
 – Four oral papillae in series, third papilla enlarged and no distinct oral tentacle scale .....44
44. Disc margin with no armament ... ***Amphioplus (Lymanella) integer*** (Fig. 209)  
 – Disc margin vertical with small spines or projections .....45
45. Thirteen disc scales between radial shields .....  
 ..... ***Amphioplus (Lymanella) furcatus*** (Fig. 207)  
 – 9–11 disc scales between radial shields .....  
 ..... ***Amphioplus (Lymanella) depressus*** (Fig. 205)
46. Three oral papillae with a single oral tentacle scale in series, second oral papilla on lower level than other two, third papilla large and broad .....  
 ..... ***Amphioplus (Unioplus) falcatus*** (Fig. 211)  
 – Three oral papillae, outermost very broad and opercular .....47
47. Radial shields narrow, bar-like .....48  
 – Radial shields broad, D-shaped; may be missing dorsal disc 'lid' .....49
48. Three arm spines ..... ***Amphipholis similis*** (Fig. 213)  
 – Four arm spines ..... ***Amphipholis squamata*** (Fig. 215)
49. Ventral disc partially skin covered, with incomplete scaling .....50  
 – Ventral disc fully scaled .....51
50. Six or more arm spines proximally, middle spine with glassy hook; distal oral papillae broad and semicircular ... ***Amphiura (Amphiura) uncinata*** (Fig. 239)  
 – Four or five arm spines proximally, none hooked; distal oral papillae elliptical leaf-like ..... ***Amphiura (Amphiura) albella*** (Fig. 221)

51. Two tentacle scales .....	52
– Tentacle scale single or absent .....	55
52. Tentacles scales moderate to large in size .....	53
Tentacle scales small in size or absent .....	54
53. Tentacle scales very large, ventral arm plates broad pentagonal .....	
..... <b><i>Amphipholis strata</i></b> (Fig. 217)	
– Tentacle scales moderate, ventral arm plates truncated pentagonal .....	
..... <b><i>Amphiura (Amphiura) acutisquama</i></b> (Fig. 219)	
54. Disc scales coarse and thick; arm spines blunt and flattened .....	
..... <b><i>Amphiura (Amphiura) incana</i></b> (Fig. 231)	
– Disc scales moderately coarse; arm spines pointed, some with terminal hook .....	
..... <b><i>Amphiura (Amphiura) otteri</i></b> (Fig. 235)	
55. One distal oral papilla, tentacle scales absent or rudimentary .....	
..... <b><i>Amphiura (Amphiura) atlantica</i></b> (Fig. 225)	
– One distal oral papilla, single tentacle scale .....	56
56. Tentacle scale oval .....	57
– Tentacle scale pointed, spiniform .....	58
57. Radial shields tapering proximally, may be only just separated distally .....	
..... <b><i>Amphiura (Amphiura) grandisquama natalensis</i></b> (Fig. 229)	
– Radial shields contiguous for at least half-length .....	
..... <b><i>Ophionephtys lowelli</i></b> (Fig. 243)	
58. At least one arm spine flattened .....	59
– Arm spines stout, blunt, tapering ...	<b><i>Amphiura (Amphiura) angularis</i></b> (Fig. 223)
59. Arm spines flattened, second lowest spine conspicuously curved; no more than five arm spines .....	<b><i>Amphiura (Amphiura) simonsi</i></b> (Fig. 237)
– Arm spines flattened, more than five arm spines .....	60
60. Radial shields long, narrow, well-separated and almost parallel, more than one-third disc radius, six arm spines ...	<b><i>Amphiura (Amphiura) linearis</i></b> (Fig. 233)
– Radial shields longer than wide, diverging and tapering distally, contiguous at distal ends, less than half disc radius; seven arm spines .....	<b><i>Amphiura (Amphiura) capensis</i></b> (Fig. 227)
61. Teeth broad and square-tipped, single apical papilla or reduced tooth ...	62
– Teeth broad and square-tipped, rounded or conical, one or many papillae ...	68
62. Disc scaling overlapping and armament absent.....	
..... <b><i>Histampica duplicata</i></b> (Fig. 249)	
– Disc with coarse scaling and armament present .....	63

63. One distal oral papilla .....64  
 – Two or three distal oral papillae .....65
64. Oral shields almost circular, as long as wide; fissiparous (usually six arms)  
 .....**Ophiactis plana** (Fig. 259)  
 – Oral shields diamond-shaped, five arms, not fissiparous, radial shields  
 contiguous distally, ventral arm plates fan-shaped .....  
 .....**Ophiactis carnea** (Fig. 253)
65. Up to four arm spines .....66  
 – More than four arm spines, usually six .....67
66. Dorsal arm plates diamond-shaped, twice as wide as long, not contiguous  
 distally; not fissiparous .....**Ophiactis abyssicola** (Fig. 251)  
 – Dorsal arm plates narrow fan-shaped, broadly in contact, longer than wide;  
 fissiparous .....**Ophiactis nidarosiensis** (Fig. 255)
67. Dorsal arm plates oval, becoming elliptical, rounded distally with median lobe  
 emphasized by two dark spots after first two to three segments; fissiparous,  
 up to seven arms but usually hexamerous .....**Ophiactis savignyi** (Fig. 261)  
 – Dorsal arm plates oval, becoming elliptical, arms marbled with dark spots;  
 not fissiparous, five long arms .....**Ophiactis** cf. **picteti** (Fig. 257)
68. No oral papillae, each jaw with cluster of apical dental papillae .....69  
 – Oral papillae present on sides of jaws, apically either a cluster of dental  
 papillae or one or a few larger oral papillae .....84
69. Disc and arms covered in skin, sometimes with granules .....70  
 – Disc scales and arm plates distinct, unless covered in armament such as  
 spines or stumps .....73
70. Arms mostly flexible horizontally; dorsal and ventral arm plates present  
 beneath skin, but dorsal arm plates may be fragmented; longest arm  
 spines easily exceeding segment length .....71  
 – Arms flexible dorso-ventrally; dorsal and ventral arm plates rudimentary/  
 absent; arm spines short, barely exceeding single segment length .....72
71. Dorsal arm plates mostly entire; seven arm spines .....  
 .....**Ophiogymna fulgens** (Fig. 275)  
 – Dorsal arm plates fragmented; eight arm spines .....  
 .....**Ophiogymna capensis** (Fig. 273)
72. Fissiparous, usually six arms; armament on disc margin usually more  
 granuliform than spinose .....**Ophiothela danae** (Fig. 277)  
 – Not fissiparous, usually five arms; disc armament usually includes marginal  
 spines .....**Ophiothela venusta** (Fig. 279)

73. Radial shields naked, very large, taking up most of dorsal side; narrow interradi al areas and centre of disc scales covered in granules .....  
 ..... ***Ophiocnemis marmorata*** (Fig. 271)  
 – Radial shields may or may not be covered in armament, but usually smaller in area than remainder of disc, which may be covered in spines or stumps ...74
74. Dorsal arm plates wide and broadly contiguous, arms long, 8–20 times D.D .....75  
 – Dorsal arm plates less than twice as long as wide, narrowly in contact, arm length moderate, 4–8 times D.D .....76
75. Radial shields densely covered in stumps or spines .....77  
 – Radial shields naked, or mostly so .....78
76. Disc covered in stumps; colour grey and dark blue or purple, both dorsally and ventrally; dorsal arms with a longitudinal light stripe bordered by two dark blue lines, ventral arms with similar stripe but less conspicuous, radial shields variegated with blue ..... ***Macrophiothrix hirsuta cheneyi*** (Fig. 265)  
 – Only disc margin with stumps; colour pink, purple with patterns on disc, arms banded every three to four segments; radial shields reddish, sometimes with blue patches, distal edge outlined with white, no longitudinal line down arms, arm spines with long thorn near tip ... ***Macrophiothrix propinqua*** (Fig. 269)
77. Ventral armament not reaching proximal edges of genital slits; dorsal side of disc greyish with more or less conspicuous dark pink spots, ventrally lighter and less spots. Arms banded purple, pink or red with white dorsally and lighter ventrally, with two to three arm segments between bands; may have white longitudinal band from c. half way down arms ..... ***Macrophiothrix demessa*** (Fig. 263)  
 – Ventral armament reaching edges of genital slits; disc dorsally and ventrally blue or purple with blue or purple spots and blotches, radial shields spotted, ventrally similar but lighter, arms banded with white, or spotted with purple ..... ***Macrophiothrix longipeda*** (Fig. 267)
78. Arms marked with one or more longitudinal lines running down arms .....79  
 – Arms patterned, but not with longitudinal lines .....81
79. Arms with either faint white longitudinal line, or light line with two darker lines either side .....80  
 – Arms with single thin dark longitudinal line along length of arm both dorsally and ventrally, dorsal arm plates with some lateral whitish patches ..... ***Ophiiothrix (Acanthophiothrix) purpurea*** (Fig. 283)
80. Dorsal arm plates hexagonal or fan-shaped, wider than long; colour brownish green with yellow or white line bordered by two dark lines of dark purple or green, longitudinal white stripe along entire length of arm with two darker lines either side ..... ***Ophiiothrix (Acanthophiothrix) proteus*** (Fig. 281)

- Dorsal arm plates fan, rhomboidal or diamond-shaped, distal side strongly convex, equally wide as long or slightly wider; colour grey, red, pink, arms similar, light white longitudinal line, sometimes bordered by pink or red striped .....**Ophiothrix (Ophiothrix) aristulata** (Fig. 285)
- 81. Dorsal arm plates armed with single short rugose stump between successive dorsal arm plates .....**Ophiothrix (Ophiothrix) echinotecta** (Fig. 287)
  - No stump between successive dorsal arm plates .....82
- 82. Disc and radial shields patterned with dark purple lines and pinkish patches with adradial edges of radial shields accentuated with dark lines, arms not banded .....**Ophiothrix (Ophiothrix) foveolata** (Fig. 289)
  - No linear patterns on disc or radial shields, arms banded and often with dots associated with dorsal arm plates .....83
- 83. Spines and stumps intermixed on disc .....**Ophiothrix fragilis** (Fig. 291)
  - Spines and stumps not intermixed on disc .....  
.....**Ophiothrix fragilis** var. **triglochis** (Fig. 293)
- 84. Both oral and dental papillae present .....85
  - Only oral papillae present, usually only single apical papilla below teeth, but sometimes two or three .....97
- 85. Two tentacle scales, beyond basal arm tentacle scale/s elongated or sword-like, aligned obliquely across ventral arm plate, forming a cross with corresponding tentacle scale .....86
  - One or two tentacle scales, both oval .....87
- 86. Only inner tentacle scale spiniform, distal oral papillae small, papilliform with rounded tips .....**Ophiopsila seminuda** (Fig. 201)
  - Both tentacle scales spiniform, distal oral papillae also spiniform .....  
.....**Ophiopsila bispinosa** (Fig. 199)
- 87. Five arms, not fissiparous .....88
  - Six arms, fissiparous .....**Ophiocomella sexradia** (Fig. 169)
- 88. Disc covered at least dorsally with dense granules .....89
  - Disc smooth or with granules and spines, upper arm spines club / clavate in shape .....96
- 89. One tentacle scale .....**Ophiocomella valenciae** (Fig. 171)
  - Two tentacle scales .....90
- 90. On one to three consecutive segments at about one–third of length of arm, uppermost arm spine enlarged or clavate ...**Breviturma pusilla** (Fig. 163)
  - Uppermost arm spines one–third of the length along arm, not enlarged ...91



91. Disc dark with radiating golden lines<sup>1</sup> ..... ***Breviturma pica*** (Fig. 161)  
 – Disc light and mottled, uniformly dark, or with spots or speckles .....92
92. Disc light with patterns / mottles of greens, whites, yellows, similar number of arm spines on each arm segment ..... ***Breviturma brevipes*** (Fig. 155)  
 – Disc brown/dark in colour .....93
93. Disc with speckles/spots .....94  
 – Disc uniformly dark above and below, tube feet red, white when preserved ...  
 ..... ***Ophiocoma erinaceus*** (Fig. 165)
94. Arm spine annulation very faint, if at all ..... ***Breviturma dentata*** (Fig. 157)  
 – Arm spine annulation strong / broken if present .....95
95. Colour greyish brown dorsally and ventrally, either with fine black reticulating lines, white-ringed black spots, or speckled with light spots; two or three tentacle scales along arms ..... ***Breviturma doederleini*** (Fig. 159)  
 – Colour broken or uniform brown; two oval tentacle scales .....  
 ..... ***Ophiocoma scolopendrina*** (Fig. 167)
96. Arm spines 3–4, spines annulated; disc uniformly dark .....  
 ..... ***Ophiomastix koehleri*** (Fig. 173)  
 – Arm spines 2–4, dark longitudinal lines on spines, disc light brown with radiating lines ..... ***Ophiomastix venosa*** (Fig. 175)
97. Arms inserted below disc, arm spines rarely much shorter than segment, projecting sideways from arm, pair of supplementary dorsal arm plates present .....98  
 – Arms fused to disc edge, arm spines usually shorter than segment and usually appressed to arm, but may be long and outstanding, supplementary dorsal arm plates only present if arm spines short and appressed to arms ..... 101
98. Genital papillae absent .....99  
 – Genital papillae present ..... 100
99. Colour pattern reticulated with a well-marked ‘V’ or ‘Y’ opposite base of each arm; supplementary dorsal arm plates triangular, length of dorsal arm plate becoming smaller distally ..... ***Ophionereis dubia dubia*** (Fig. 193)  
 – Disc white with large reddish-brown dense spot or star in middle of disc; supplementary dorsal arm plates large ... ***Ophionereis vivipara*** (Fig. 197)
100. Supplementary dorsal arm plates small and only well-developed on proximal part of arms; disc scales coarse, subequal ... ***Ophionereis australis*** (Fig. 191)  
 – Supplementary dorsal arm plates well-developed for most of arm, interradial disc scales distinctly smaller than radial and marginal plates ...  
 ..... ***Ophionereis porrecta*** (Fig. 195)

<sup>1</sup> Some species of *Breviturma* have a different night and day colouration (Hendler 1984)

101. Disc densely granulated, including jaws and sometimes including oral shields and adoral shields .....	102
– Disc scales naked and most often distinct .....	113
102. Oral shields mostly covered in granules .....	103
– Oral shields naked .....	106
103. One tentacle scale .....	104
– Two or three tentacle scales .....	105
104. Teeth wide with hyaline edges; disc concealed by granules, no granules on basal arm segments .....	<b><i>Ophioconis cupida</i></b> (Fig. 149)
– Teeth pointed, no hyaline edges; disc concealed by granules, granules extending onto basal arm segments .....	<b><i>Cryptopelta aster</i></b> (Fig. 123)
105. Disc covered in granulation and spinelets; arm spines all shorter than one segment length; tentacle scales two proximally, one along most of arm .....	<b><i>Ophiochaeta hirsuta</i></b> (Fig. 135)
– Disc covered in granulation; arm spines less than half segment length; tentacle scales three basally, two distally.....	<b><i>Ophiodyscrita acosmeta</i></b> (Fig. 125)
106. Genital slits single (two in each interradius .....	107
– Genital slits two (four in each interradius) .....	<b><i>Ophioderma wahlbergii</i></b> (Fig. 133)
107. Radial shields naked .....	108
– Radial shields covered in armament .....	111
108. Oral shields and supplementary oral shields naked; radial shields moderate to small .....	109
– Oral shields and supplementary oral shields concealed by granules, easily rubbed off; radial shields very large .....	<b><i>Ophiochasma nitida</i></b> (Fig. 131)
109. Arm spines same length as segment except lowermost, which is twice as long as segment; colour bright red .....	<b><i>Ophiarachna septemspinosa</i></b> (Fig. 153)
– Arm spines short, no longer than half segment length, colour combination of browns, greens and / or whites .....	110
110. Arm spines conical, with lowermost shorter than half segment length, colour irregular patterns of browns, sometimes with irregular dark spot or blotch in middle of disc .....	<b><i>Ophiarachnella capensis</i></b> (Fig. 127)
– Arm spines tapering, all half segment length; colour greens, greys and whites ...	<b><i>Ophiarachnella gorgonia</i></b> (Fig. 129)
111. Arm spines long and flaring, all exceeding segment length .....	<b><i>Ophiarachna affinis</i></b> (Fig. 151)
– Arm spine length never exceeding segment length .....	112

112. Marginal plates enlarged, few but large, supplementary oral shields covered in granules ..... ***Ophiopeza fallax fallax*** (Fig. 137)
- Marginal plates enlarged, many but small, supplementary oral shields not covered by granules ..... ***Ophiopeza spinosa*** (Fig. 139)
113. Oral slits generally tightly closed, oral papillae not in continuous series with oral tentacle scales, no true tentacle scales, disc scales thick ..... 114
- Oral slits may be closed, oral papillae in continuous series with oral tentacle scales, disc scaling usually distinct, but not necessarily thick ..... 118
114. Disc scales smooth or tumid, low granules, oral papillae not fused ..... 115
- Disc scales smooth, oral papillae fused ..... 116
115. Dorsal interradial area covered by a single scale, many scales of various sizes on remainder of dorsal disc, low and tumid tubercles present on disc ...  
..... ***Ophiomusa lymani*** (Fig. 51)
- Dorsal interradial area with many scales, disc scales naked ..... 117
116. Dorsal interradial area covered by a single scale, but remainder of disc with many scales of various sizes, three arm spines, one separated from other two ..... ***Anophiura simplex*** (Fig. 75)
- Dorsal interradial margin covered by a single scale with remainder of dorsal disc scales few and of similar size; three arm spines, equally spaced  
..... ***Aspidophiura corone*** (Fig. 77)
117. Disc scales surrounded by smaller scales both dorsally and ventrally, colour pink to brown, irregularly marbled with grey, white or silver patches .....  
..... ***Ophiolepis cincta cincta*** (Fig. 183)
- Disc scales naked, imbricating, colour dark green or grey with irregular patterns and patches on dorsal disc conforming to interradial areas .....  
..... ***Ophioplocus imbricatus*** (Fig. 185)
118. Disc extending into flat pentagon, lateral arm plates extremely modified, interradial edges straight, fringed by modified arm plates, free arm segments very reduced ..... ***Astrophiura permira*** (Fig. 53)
- Disc not extending beyond normal limits, no modification to lateral arm plates or arm spines, free arm segments not reduced ..... 119
119. Disc scaled, granules at least on disc margin or on jaws ..... 120
- Disc scaled, granules absent ..... 122
120. Oral shields huge, reaching into ventral interradial area, disc with granules and jaws with scattered granules ..... ***Ophiopallas paradoxa*** (Fig. 181)
- Oral shields not extending into interradial area, disc margin with scattered granules, usually extending onto radial shields, no granules on jaws ..... 121

121. Arm spines three, longest spine as long as ventral arm plate, but others shorter than segment; bristles present on lateral arm plates .....  
 ..... ***Ophiernus vallincola*** (Fig. 179)
- Arm spines four, shorter than segment, decreasing distally; no bristles on lateral arm plates ..... ***Ophiernus quadrispinus*** (Fig. 177)
122. Single tentacle scale, tentacle pores stopping abruptly after first 2–5 arm segments; oral papillae two, fused each side of triangular apical papillae .....  
 ..... ***Ophiomisidium pulchellum*** (Fig. 55)
- One or more tentacle scales on basal pores, but often only one along arms; oral papillae three or more, not fused ..... 123
123. Oral shield distal lobe not well-developed or enlarged; three (*Ophiura kinbergi* only) or five or more tentacle scales on second oral pore ..... 128
- Oral shield distal lobe well-developed; one to three tentacle scales on second oral pore if present ..... 124
124. Arm spines short, none more than one-third segment length ..... 125
- Arm spines with at least one exceeding segment length ..... 126
125. Dorsal arm plates fan-shaped with rounded distal edge, contiguous, up to six arm spines, subequal, short and blunt ... ***Amphiophiura sculptilis*** (Fig. 71)
- Dorsal arm plates bell-shaped, twice as long as wide proximally, first 4–5 plates contiguous, arm spines no more than three, one spine (usually uppermost) becoming hooked ..... ***Amphiophiura trifolium*** (Fig. 73)
126. Three arm spines, uppermost spine exceeding segment length ..... 127
- Three arm spines, uppermost two spines exceeding segment length .....  
 ..... ***Ophiocten affinis simulans*** (Fig. 57)
127. Uppermost spine usually thicker than other two spines .....  
 ..... ***Ophiocten hastatum*** (Fig. 61)
- Uppermost spine not thicker than other two spines .....  
 ..... ***Ophiocten amitinum*** (Fig. 59)
128. Radial shields contiguous, double arm combs .....  
 ..... ***Dictenophiura anoidea*** (Fig. 69)
- Radial shields not contiguous or only just touching; arm combs single ... 129
129. Uppermost arm spines much longer and stouter than others, exceeding segment length, dorsal arm plates oval and small ... ***Ophiura trimeni*** (Fig. 67)
- Arm spines similar, longest spines not longer than segment ..... 130
130. Three arm spines, middle spine becoming upturned hook on distal segments; genital papillae squat and broad ..... 131
- Three arm spines, all similar, genital papillae small and tapering ..... 134

131. Disc scales large, few interstitial scales .....132  
 – Disc scales medium or small, many interstitial scales .....133
132. Arm combs separated radially by more than half width of first free arm segment, disc scales not convex and dorsal arm plates almost flat in profile and contiguous.....***Ophiuroglypha costata*** (Fig. 79)  
 – Arm combs approximating mid–radially, larger disc and dorsal arm plates not contiguous, swollen and convex in side view .....  
 .....***Ophiuroglypha tumida*** (Fig. 81)
133. Arm combs present but not distinct, widely separated, papillae stout and short, disc scales small, many and irregular, supplementary ventral arm plate present on basal segments .....  
 .....***Ophiuroglypha irrorata irrorata*** (Fig. 83)  
 – Arm combs not widely separated, distinct, papillae large, square; disc scales thick, medium-sized, irregular .....***Ophiuroglypha schmidtotti*** (Fig. 85)
134. Deep hollows between basal ventral arm plates ...***Ophiura kinbergi*** (Fig. 63)  
 – No hollows between basal ventral arm plates .....135
135. Radial shields almost half disc radius, not widely separated, small spines on disc, small in size .....***Ophiura ljunmani*** (Fig. 65)  
 – Radial shields small, oval, partly covered by disc scales, widely separated, no discspines, large in size .....‘***Ophiura flagellata*** (Fig. 87)

