

APPENDIX 1.4.0

Type a3,4/b(1,2)±6±7±10±12

Lanceolate to polygonal shaped with one apex/acute prominence. With or without various crown ornament. May have pedicle, platform, or base.

List of Tofino Basin subtypes a3,4/

a3/b2±12/c3/d5+6/e1/f1/g1+2/h3/i1.3-1.5/j3 cf. *rhombus kite* Gupta, 1991

a4/b2±6/c3/d2+3/e2/f3/g1+2/h1,2,3/i1-2/j3 *kite-shaped longitudinal line*
Doyle, Kennedy, and Riedel, 1974

a4/b2±6/c3/d3/e1,2/f3/g1+4/h1/i1-1.5/j3,4 cf. *kite-shaped longitudinal line*
Doyle, Kennedy, and Riedel, 1974

a4/b2±6±12/c2,4/d4±(7,8)+10±13/e3/f3,4/g1/h1,2/i1,2/j(4,5,6)+11+13/k0,
1,2,4±8/l1,2/m0,9/ n0,3,4 *pointed and skirted* Doyle, Dunsworth, and
Riedel, 1978

a4/b2+6/c2/d4+8+10/e1,3/f4/g1,2/h2/i1/j(5,9)+11+13/k1,8/l2/m9/n3,4?
cf. *pointed and skirted* Doyle, Dunsworth, and Riedel, 1978

a4/b6+8/c2/d2+8/e1/f0/g1,2/h1/i1,2/j2+(11,12)/k1/l3/m0/n1 *Raja* sp. A
(Figure 14.1-14.4)

a4,6/b1/c2/d1/e0/f3,4/g3/h1/i1/j1/k1/l3/m0,1/n0,1 cf. *ogee lanceolate*
Tway, Doyle, and Riedel, 1985

Undescribed forms:

a3,4/b2/c2/d4+10/e2,3/f0/g0/h2/i1/j2+11/k3/l0/m0/n0 or

a11/b2/c2/d0/e1/f3/g1/h2/i4+8/j4 undescribed elasmobranch dermal
denticle or tooth, Form B

a4/b1,2/c2/d1,4/e1,3/f0/g0/h0,1/i1/j6+12+13/k1/l2/m0/n0 undescribed
elasmobranch dermal denticle, Form C

a4/b2+6/c2/d4+8/e3/f0/g0/h1/i1/j(1,2)+11/k1/l2/m0/n0 undescribed
elasmobranch dermal denticle, Form D

a4/b2+6/c2/d4+8/e3/f0/g0/h1/i1/j1+12/k1/l2/m0/n0 undescribed
elasmobranch dermal denticle, Form E

a4/b2+6/c2/d4+8/e3/f0/g0/h1/i1/j6+12+13/k2/l3/m0/n0 undescribed
elasmobranch dermal denticle, Form F

a4/b2+6±12/c2/d4+8+10+13/e3/f8/g3/h1,2/i1/j5+11+15/k2/l3/m1/n1
undescribed elasmobranch dermal denticle, Form G

a4/b(2,7)+6/c2/d(2,4)+8+10/e0,2/f3,4/g2,3/h1/i1,4/j2+11/k2/l1/m9/n2
undescribed elasmobranch dermal denticle, Form H

a4/b2+10/c2/d4+10+14/e3/f0/g2/h1/i1,4/j4+11+13/k4,5/l1,2/m0,2/n0
undescribed elasmobranch dermal denticle, Form I

a4/b2+13/c2/d4+12/e3,4/f0/g0/h1/i1/j0/k1/l1/m0/n0 undescribed
elasmobranch dermal denticle, Form J

a4/b6+7/c2/d2+8/e1/f8/g3/h1/i1,2/j2+11/k1,2/l3/m1/n1 undescribed
elasmobranch dermal denticle, Form K

APPENDIX 1.4.1

Type a3,4/b(1,2)±6±7±10±12

Lanceolate to polygonal shaped with one apex/acute prominence. With or without various crown ornament. May have pedicle, platform, or base. ³¹

c. Shape of the crown ^{2, 9, 31}

0. indeterminate or none of the following ^{9, 19}

1. not used ³²

2. lanceolate ^{2, 8, 9, 19, 32}



d. Features on upper crown surface ³¹

0. indeterminate or none of the following ^{2, 8, 9, 19}

1. absent (smooth) ^{8, 9, 19, 31, 32}



2. one median line, ridge, keel, or platform ^{7, 8, 19, 31, 32}



3. two lines, ridges, or keels ^{9, 19, 31, 32}



4. three or more parallel to subparallel lines, ridges, or keels which do not converge centrally ^{8, 9, 19, 31, 32}



5. three or more parallel to subparallel lines, ridges, or keels which converge centrally ^{9, 11, 19, 31}



6. irregular network of lines, or dendritic lines ^{8, 9, 19, 22}



7. faint and often non-continuous line parallel to anterior crown margins ^{31, 32}



8. prominent and continuous line, ridge or keel parallel to anterior crown margins ^{31, 32}



9. lines, ridges or keels which curve over crown anterior and posterior margins ^{31, 32}



10. median keel or platform that is more raised and broader than lateral lines, ridges, keels or platforms without closely paired lines, ridges or keels ^{31, 32}



11. platform with interior paired lines, ridges or keels; furrows on each side of platform do not undercut ^{31, 32}



12. high platforms with interior paired lines, ridges or keels; deep furrows on each side of platform which undercut ^{31, 32}



13. one or more lines terminating in a Y-shaped fork at end opposite acute prominence ^{7, 8, 32}



14. nodular (especially where lines or ridges join anterior longitudinal line) ³²



- e. Anterior crown margin opposite the peak ^{9, 19, 31}

0. indeterminate or none of the following ^{9, 19, 31}

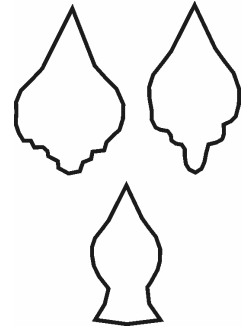
1. rounded ^{9, 19, 32}



2. approximately V-shaped, angular ^{9, 19, 32}



3. irregular, uneven, or undulating (may have mesial protrusion) ^{9, 19, 31, 32}



4. flared into an irregular structure ^{9, 19, 31, 32}

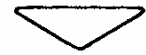
f. Outline of pedicle base subsurface ^{9, 19, 31}

0. indeterminate or none of the following ^{9, 19}

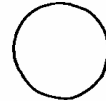
1. equilateral triangle ^{9, 19}



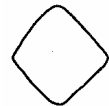
2. isosceles triangle ^{9, 19}



3. circular to subcircular, smooth margins ^{9, 19}



4. square to diamond (rhomboid) shaped ^{9, 19}



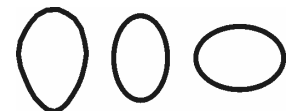
5. circular to subcircular, crenulated margins ^{9, 19}



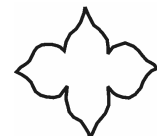
6. cruciform ^{9, 19}



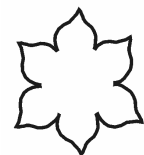
7. ovoid to elliptical ^{19, 32}



8. tetrapetaloid ^{31, 32}



9. multi-petaloid ^{31, 32}



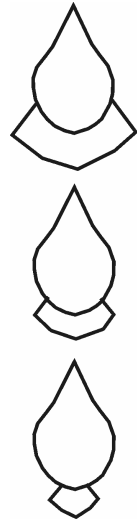
g. Size of pedicle (at anterior and sides) ^{9, 19, 31}

0. indeterminate or none of the following ^{9, 19}

1. pedicle wider than crown ^{9, 19, 31, 32}

2. pedicle same width as crown ^{9, 19, 31, 32}

3. pedicle narrower than crown ^{9, 19, 31, 32}



h. Development of lateral peaks on posterior crown ^{9, 19, 31}

0. indeterminate ^{9, 19}

1. no development, smooth margins ^{9, 19}

2. some development, irregular margins ^{9, 19}



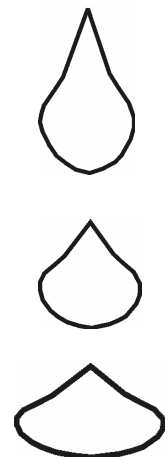
i. Length/width ratio of crown ^{19, 31}

0. indeterminate ¹⁹

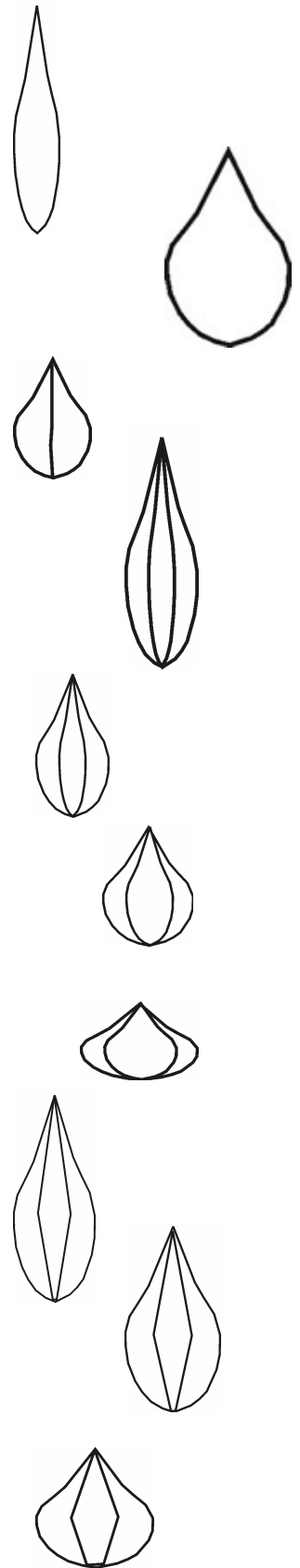
1. length greater than width, but less than three times width ^{19, 32}

2. length approximately equal to width ^{19, 32}

3. length less than width ^{19, 32}



4. length greater than three times width ^{19, 32}
- j. Upper crown mesial platform (or differentiated structure) ^{31, 32}
0. indeterminate or none of the following ^{31, 32}
 1. absent or considerably reduced ^{31, 32}
 2. one line, ridge, or keel ^{31, 32}
 3. narrow and elongate lanceolate (rounded anterior margin, pointed posterior margin), (greater than five times longer than wide) ^{31, 32}
 4. elongate lanceolate (three to five times longer than wide) ^{31, 32}
 5. lanceolate (greater than one to less than three times longer than wide) ^{31, 32}
 6. broad lanceolate (equally as long as wide, or wider than long) ^{31, 32}
 7. narrow and elongate rhomboid (greater than five times longer than wide) ^{31, 32}
 8. elongate rhomboid (three to five times longer than wide) ^{31, 32}
 9. rhomboid (two to three times longer than wide) ^{31, 32}



10. broad rhomboid (equally as long as wide, or wider than long) ^{31, 32}



11. long, extends anterior to posterior (greater than 1/2 crown length) ^{31, 32}



12. short, (less than or equal to 1/2 crown length) ^{31, 32}



13. with internal lines, ridges, or keels (which are not closely paired) ^{31, 32}



14. with closely paired lines, ridges, or keels ^{31, 32}



15. with lines or ridges which bifurcate anteriorly ³²



k. Features on the subcrown ³¹

0. indeterminate or none of the following ³¹



1. absent (smooth) ^{31, 32}

2. one median line, ridge, keel, or platform ^{9, 19, 32}



3. two lines, ridges, keels, or platforms ^{31, 32}



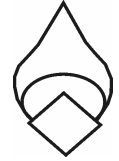
4. three or more short parallel to subparallel lines, ridges, or keels which commonly do not exceed 1/2 the crown length ^{31, 32}



5. three or more long parallel to subparallel lines, ridges, or keels which commonly extend from posterior pedicle margin to posterior crown margin or apex ^{31, 32}



6. curved line, ridge, or keel near the subcrown centre posterior region around pedicle ^{19, 31, 32}



7. curved depression surrounding junction of crown and pedicle ^{19, 31, 32}



8. stippled or pitted ³²



l. Anterior crown overhang of pedicle/crown junction ^{31, 32}

0. indeterminate ^{31, 32}

1. absent (crown drops obliquely or vertically to pedicle) ^{31, 32}



2. minor (crown slightly curves under to pedicle) ^{31, 32}



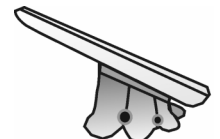
3. prominent (crown significantly curves under to pedicle) ^{31, 32}



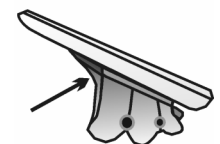
m. Pedicle type ³¹

0. indeterminate or none of the following ³¹

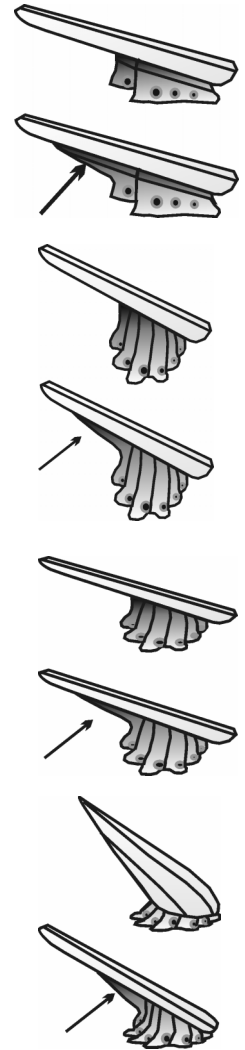
1. tetrahedroid ^{31, 32}



2. keeled tetrahedroid ^{31, 32}

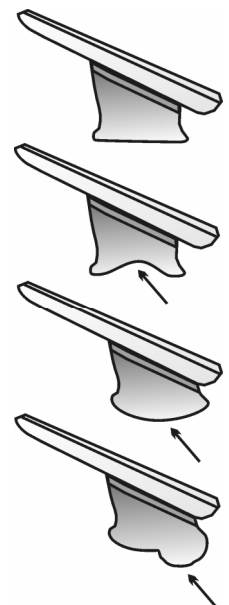


3. expanded tetrahedroid ^{31, 32}
4. keeled expanded tetrahedroid ^{31, 32}
5. tall trunk ^{31, 32}
6. keeled tall trunk ^{31, 32}
7. trunk-like ^{31, 32}
8. keeled trunk ^{31, 32}
9. short trunk ³²
10. keeled short trunk ³²



- n. Pedicle subsurface ³¹
0. indeterminate or none of the following ³¹

1. flat ^{31, 32}
2. concave ^{31, 32}
3. convex ^{31, 32}
4. convex with bulge to one side ^{31, 32}



3. kite-shaped, with two longer sides ^{2, 8, 9, 19, 32}

d. Pattern of lines on upper crown surface ^{2, 8, 9}

0. indeterminate or none of the following ^{2, 8, 9}

1. absent ^{2, 8, 9}

2. one line ^{2, 8, 9}

3. three or more lines; parallel to subparallel ^{2, 8, 9}

4. irregular network of lines or dendritic ^{2, 8, 9}

5. lines converge at acute prominence ^{2, 7}

6. median line bifurcates ^{2, 7, 8}

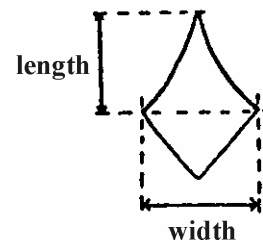
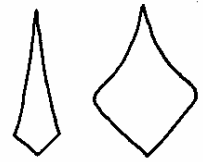
e. Length of acute prominence (apex or pointed margin) ^{2, 8, 9}

0. indeterminate ^{2, 8, 9}

1. length equal to or less than width of base ^{2, 8, 9, 30}

2. length less than twice width of base ^{2, 8, 9}

3. length more than twice but less than three times width of base ^{2, 8, 9}



4. length more than three times width of base ^{2, 8, 9}



- f. Narrow differentiated area at upper crown margin ^{2, 8, 9}

0. indeterminate ^{2, 8, 9}



1. absent ^{2, 8, 9}



2. present on long sides ^{2, 8, 9}



3. present on short sides ^{2, 8, 9}



- g. Margin ^{2, 8, 9}

0. indeterminate or none of the following ^{2, 8, 9}



1. smooth and continuous on long sides (on sides of acute prominence) ^{2, 8, 9}



2. smooth and continuous on short sides (on sides opposite acute prominence) ^{2, 8, 9}



3. irregularly undulating on long sides (on sides of acute prominence) ^{2, 8, 9}



4. irregularly undulating on short sides (on sides opposite acute prominence) ^{2, 8, 9}



5. regularly undulating on long sides (on sides of acute prominence) ^{2, 8, 9}

6. regularly undulating on short sides (on sides opposite acute prominence)^{2, 8, 9}



7. broken on long sides (on sides of acute prominence)^{2, 8, 9}



8. broken on short sides (on sides opposite acute prominence)^{2, 8, 9}



h. Degree of curvature on sides of acute prominence^{7, 8}

0. indeterminate or none of the following⁸



1. straight or slightly concave^{7, 8}

2. pronounced concave^{7, 8}



3. sigmoid³²

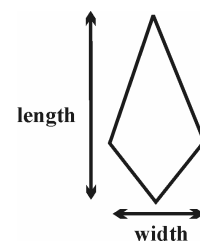


4. convex³²



i. Length to width ratio^{19, 32}

Recorded as numbers³²



j. Degree of curvature on sides opposite acute prominence ³²

0. indeterminate or none of the following ³²

1. straight ³²

2. pronounced convex ³²

3. pronounced concave ³²

4. regularly undulating ³²

5. irregularly undulating ³²



4. rhombic ^{2, 8, 9, 19}

d. Pattern of lines, ridges, or keels on upper crown surface ^{2, 9, 19, 31}

0. indeterminate or none of the following ^{2, 9, 19}

1. absent ^{2, 9, 19}

2. one line, ridge, or keel ^{2, 9, 19, 31}

3. two or more parallel to subparallel lines, ridges, or keels not converging centrally or at a corner ^{2, 9, 19, 31}



4. three or more parallel to subparallel lines converging at or near one or more corner ^{2, 9, 19}



5. irregular network of lines, ridges, or keels ^{2, 9, 19, 31, 32}



6. concentric chevrons, with centre at one corner of crown ^{9, 19, 31}



7. concentric rhombs with centre at middle of crown ^{9, 19, 31}



8. many parallel or subparallel lines arising predominantly from one or two edges of crown ¹⁹

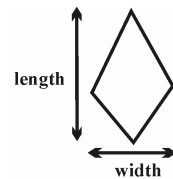


9. concentric rhombs with centre at one corner of crown ^{19, 31}



- e. Length/width ratio of crown ^{9, 19, 31}

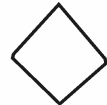
0. indeterminate ^{9, 19}



1. length greater than width ^{9, 19, 32}



2. length approximately same as width ^{9, 19}



3. length less than width ^{31, 32}



f. Other features present ^{9, 19}

0. indeterminate or none of the following ^{9, 19}

1. no other significant features ¹⁹

2. one line, ridge, or keel on subcrown ^{9, 19, 30, 31}

3. platform, pedicle, or base present (basal/subcrown and side views) ^{9, 19, 30, 31}

4. more than one line, ridge, or keel on subcrown ^{19, 30, 31}

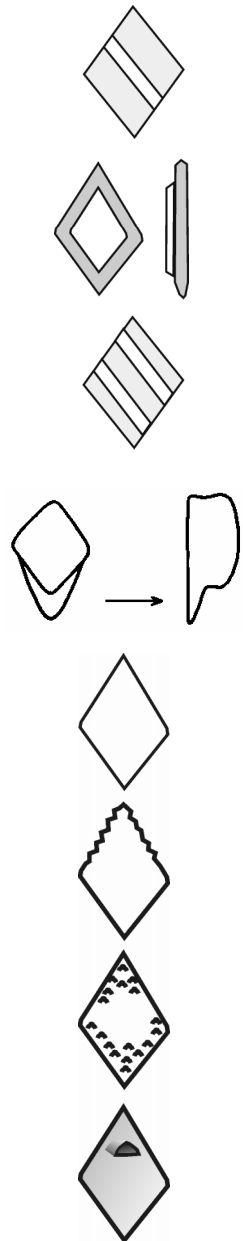
5. extension of crown into a peg-like structure ^{9, 19, 31}

6. subcrown smooth and unornamented ^{30, 31, 32}

7. one or two crown edges serrated ^{30, 31, 32}

8. upper crown surface with stippled region(s) ^{30, 31, 32}

9. canal opening(s) or hooded foramina on upper crown surface ^{30, 31, 32}



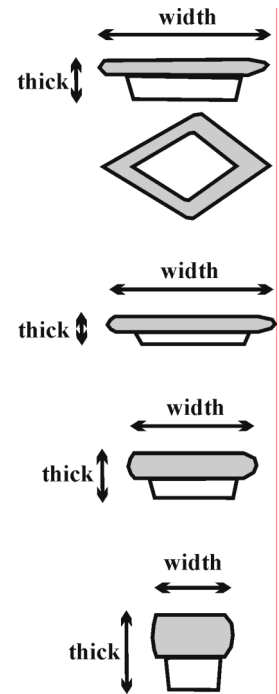
g. Thickness of element (crown and base) ^{9, 19, 32}

0. indeterminate ^{9, 19}

1. very flattened (thickness less than 1/4 maximum width) ^{9, 19, 31, 32}

2. moderately flattened (thickness = 1/4 - 1/2 maximum width) ^{9, 19, 32}

3. very thick (thickness greater than maximum width) ^{9, 19, 32}



5. **cruciform** ¹¹

