

mL.min⁻¹ and injection volume 20 µL. Calibration was performed externally using six DA calibration standards between 0.2 µg.mL⁻¹ to 10 µg.mL⁻¹ prepared from certified reference standard obtained from the NRC, Canada. Calibration curves were prepared for each sample batch and were always linear ($R^2 > 0.999$).

Statistical analysis of all data was performed using SPSS, Version 12.

RESULTS

Scallops used in this comparative study of DA toxin concentration were of a similar size (Table 1). Based on individual scallop measurements, the mean shell length and shell height for seabed scallops was 108.8 ± 3.9 mm by 96.4 ± 3.9 mm compared with 111.6 ± 5.2 mm by 99.4 ± 4.6 mm for longline scallops.

Mean DA concentration in the hepatopancreas of individual seabed scallops was 326.4 ± 169.9 µg.g⁻¹ compared with 313.9 ± 214.6 µg.g⁻¹ for longline scallops over the 12-month study at this location.

Mean DA concentrations in hepatopancreas and gonad of seabed and longline scallops on the 10 sampling occasions are provided in Table 1. DA toxin concentration in hepatopancreas of seabed and longline scallops exhibited similar trends over the 12-month duration (Fig. 2). The highest mean concentrations of DA in hepatopancreas were recorded on the second sampling occasion (April 3, 2003), individual DA concentrations reaching 1037.1 µg.g⁻¹ in seabed scallops and 1212.6 µg.g⁻¹ in longline scallops respectively. Comparison of the mean DA concentrations in hepatopancreas of seabed and longline scallops using a *t*-test demonstrated no statistically significant difference for 9 of the 10 samples. Only the sample from November 12, 2003 showed a significant difference ($n = 23$, $t = 3.263$, sig. = 0.004) in the mean DA concentration between seabed scallops (298.3 ± 89.4 µg.g⁻¹) and longline scallops (172.4 ± 95.7 µg.g⁻¹).

DA concentrations in composite samples of gonad tissue never exceeded the regulatory limit of 20 µg.g⁻¹ and were considerably lower than concentrations recorded in hepatopancreas. Overall mean DA concentrations based on triplicate analysis of composite gonad samples were 5.0 ± 2.1 µg.g⁻¹ in seabed scallops compared with 3.8 ± 1.9 µg.g⁻¹ in longline scallops. DA toxin concentration

in gonads of seabed and longline scallops exhibited considerable fluctuations and dissimilar trends over the 12-mo study duration (Fig. 2). Because DA toxin concentration of gonads is influenced by both the mass of DA in the intestinal loop within the gonad and the mass of gonad tissue itself, the reproductive condition of scallops from both sample batches was determined in an attempt to understand the fluctuations and trends over the 12-mo study (Fig. 3). Relative gonad height (RGH) in both sample groups showed a similar trend with peak RGH at the end of May. Seabed scallops exhibited higher RGH than longline scallops, although differences between sample groups were not significant ($n = 236$, $t = 1.448$, sig. = 0.149). The decline in RGH suggested a single prolonged spawning at this study location, although the use of monthly sampling for determination of the number of spawnings is not recommended (Slater 2005). Because of fluctuations in DA concentration within and between sample groups and varying reproductive condition over the 12-month study, the mass of DA in gonad was determined to examine if it better represented the changes in DA levels in gonad (Fig. 4). For comparative purposes the mass of DA in hepatopancreas was also determined (Fig. 4).

DA concentrations in composite samples of adductor muscle were below the limit of detection (LOD = 0.1 µg.g⁻¹) in all samples over the 12-month study duration.

DISCUSSION

DA concentrations in hepatopancreas were approximately 1 to 2 orders of magnitude greater than in gonad, hence if differences occurred between toxin concentration in longline and seabed scallops; such differences should be more easily recorded in those tissues having the higher DA concentration. Individual analysis of each hepatopancreas showed high inter-animal variability in DA concentration within each sample. Coefficients of variation (CV) of DA concentration in hepatopancreas of longline scallops ranged from 10.7% to 55.5% whereas that of seabed scallops ranged from 17.8% to 49.5%. The mean CV of DA concentration in hepatopancreas of longline and seabed scallops was 42.3% and 31.0% respectively. Similar high levels of inter-animal variability in DA concentration in king scallops have been reported (Campbell et al. 2001, Blanco et al. 2002, Bogan et al. 2006). Over the 12-month duration of the study similar DA concentrations in hepatopancreas

TABLE 1.
Concentration of DA in hepatopancreas and gonad of seabed and longline scallops from Feb 03 to Feb 04.

Seabed					Longline			
		Shell Length	Conc. of DA in HP	Conc. of DA in gonad		Shell Length	Conc. of DA in HP	Conc. of DA in gonad
	n	(mm)	(µg.g ⁻¹)	(µg.g ⁻¹)	n	(mm)	(µg.g ⁻¹)	(µg.g ⁻¹)
26-Feb-03	12	112.91 ± 2.71	272.58 ± 59.77	2.00 ± 0.24	12	111.58 ± 4.19	283.67 ± 62.69	2.25 ± 0.03
03-Apr-03	12	108.54 ± 4.08	697.96 ± 156.55	5.35 ± 0.64	10	112.50 ± 2.46	837.70 ± 250.84	7.10 ± 0.23
23-May-03	12	109.17 ± 3.69	457.68 ± 134.61	4.07 ± 0.46	10	107.80 ± 2.90	452.53 ± 202.18	7.12 ± 0.30
03-Jul-03	12	107.67 ± 2.57	216.50 ± 107.22	2.99 ± 0.43	11	108.70 ± 5.31	296.05 ± 114.60	2.24 ± 0.24
30-Jul-03	12	108.08 ± 3.34	332.70 ± 140.64	6.07 ± 1.21	12	113.83 ± 5.29	265.90 ± 56.09	1.96 ± 0.98
03-Sep-03	12	109.91 ± 2.84	304.98 ± 69.39	6.72 ± 0.21	12	109.75 ± 4.67	262.16 ± 111.62	2.58 ± 0.06
25-Sep-03	12	111.91 ± 2.42	223.68 ± 65.37	8.45 ± 1.01	12	113.42 ± 5.87	210.45 ± 99.96	3.54 ± 0.26
12-Nov-03	12	110.08 ± 1.62	298.33 ± 89.42	3.55 ± 1.12	12	114.64 ± 6.83	172.42 ± 95.67	3.09 ± 0.15
04-Dec-03	12	104.50 ± 2.97	238.98 ± 109.41	6.56 ± 2.65	12	111.08 ± 5.71	208.72 ± 46.59	4.36 ± 1.12
11-Feb-04	12	104.36 ± 2.98	245.24 ± 43.75	4.02 ± 0.66	12	112.92 ± 4.99	244.55 ± 103.88	3.76 ± 0.79

Values represent the mean ± standard deviation.