Appendix 1

Supplementary Discussion

Field Survey. Two factors may have resulted in the relatively high within-site variation in penis size (Fig. 2a). First, variation in any correlations involving soma mass might arise due to variation in reproductive condition, either directly because penis morphology is known to vary with reproductive condition in many barnacle species, or indirectly because testes and seminal vesicles are part of the soma mass used as a proxy for body size. Second, although we visually controlled for density during collection, density of surrounding individuals may have varied slightly between samples and may play a role in barnacle penis length.

Field Transplant Experiment. Although some experimental barnacles died during the transplant experiment (see Methods), our results are unlikely to be influenced by differential mortality. First, a mismatch between penis form and flow conditions is not likely to cause any direct mortality. Second, we found no empty barnacle shells on the transplant plates, implying that all barnacles died due to dislodgement from waves (any other cause of mortality would have left intact shells attached to the transplant plates) not from mismatched penis form. Third, exposed-shore barnacles presumably adapted to high flow conditions still experienced mortality at the exposed site during the experiment. Finally, because barnacle legs and penises must both extend into flow, and barnacle legs are highly plastic in response to flow at these same sites, conditions that favour plasticity in legs are highly likely to favour plasticity in penises as well. Collectively these observations strongly suggest that phenotypic plasticity is responsible for producing the different morphologies observed in different growth environments.

Supplementary Results

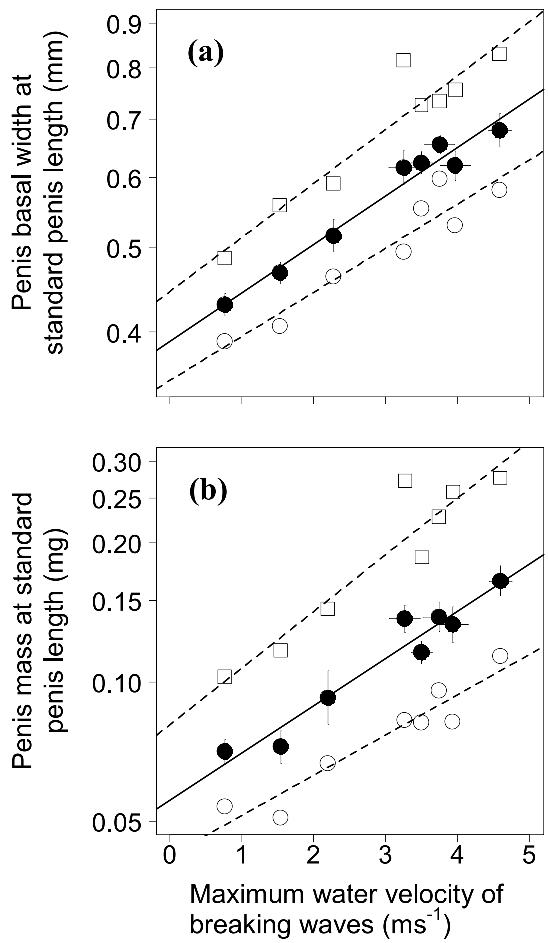

fig. S1. Variation in penis shape of the barnacle *Balanus glandula* as a function of wave-exposure, standardized to first quartile (open circles), mean (closed circles), and third quartile (open squares) of penis length using ANCOVA assuming unequal slopes among sites. **(a)** Penis basal width at standard penis length (corresponds to Fig. 2c). **(b)** Penis mass at standard penis length (corresponds to Fig. 2d). All points are mean ± s.e.m. (error bars are only shown for closed circles for clarity and are smaller than the symbols where they appear absent).

table S1. Field Survey scaling relationships*.

x	y	Predicted isometric slope	df	r	RMA slope	Probability slopes do not differ from isometry
Log(soma mass)	Log(penis length)	0.333	1,151	0.6957	0.3612	0.188
Log(soma mass)	Log(penis mass)	1	1,149	0.907	1.0072	0.492
Log(soma mass)	Log(penis basal width)	0.33	1,154	0.8572	0.3762	0.008
Log(penis mass)	Log(penis length)	3	1,154	0.7911	3.1496	0.27
Log(penis length)	Log(penis basal width)	1	1,150	0.6933	1.2154	<0.001

(* Slopes, and therefore coefficients of allometry, did not vary significantly among sites: $\alpha = 0.01$ after Bonferroni Correction for multiple comparisons, P> 0.0128 for equality of slopes for all scaling relationships.)

table S2. Field Survey ANCOVA statistics.

	Log(penis length)				Log(penis mass)			
Source of variation	df	MS	*F*	*p*	df	MS	*F*	*p*
Log(soma mass)	1	0.936	162.10	<0.001	1	13.787	676.53	<0.001
Field site	7	0.025	4.29	<0.001	7	0.018	0.86	0.539
Equality of slopes	7	0.007	1.13	0.245	7	0.015	0.747	0.632
Residual	136	0.006	-	-	135	0.020	-	-

	Log(penis basal width)				Log(penis mass)			
Source of variation	df	MS	*F*	*p*	df	MS	*F*	*p*
Log(penis length)	1	1.341	260.66	<0.0001	1	10.371	385.57	<0.001
Field site	7	0.093	18.13	<0.0001	7	0.325	12.09	<0.001
Equality of slopes	7	0.014	2.67	0.013	7	0.057	2.13	0.045
residual	136	0.005	-	-	131	0.027	-	-

table S3. Field Survey regression statistics calculated using estimated winter water velocities.

	log(penis length at standard soma mass)				
	df	MS	*F*	*p*	adjusted r-squared
water velocity (from leg lengths)	1	0.007	16.476	0.007	0.689
residual	6	0.000			

	log(penis mass at standard soma mass)				
	df	MS	*F*	*p*	adjusted r-squared
water velocity (from leg lengths)	1	0.006	37.857	0.001	0.840
residual	6	0.000			

	log(penis basal width at standard penis length)				
	df	MS	*F*	*p*	adjusted r-squared
water velocity (from leg lengths)	1	0.032	154.050	<0.001	0.956
residual	6	0.000			

	log(penis mass at standard penis length)				
	df	MS	*F*	*p*	adjusted r-squared
water velocity (from leg lengths)	1	0.119	149.050	<0.001	0.955
residual	6	0.001			

table S4. Field Survey regression statistics calculated using summer water velocities.

	log(penis length at standard soma mass)				
	df	MS	*F*	*p*	adjusted r^2
summer water velocity	1	0.007	21.137	0.004	0.742
residual	6	0.002	0.000		

	log(penis mass at standard soma mass)				
	df	MS	*F*	*p*	adjusted r^2
summer water velocity	1	0.006	63.669	<0.001	0.900
residual	6	0.001			

	log(penis basal width at standard penis length)				
	df	MS	*F*	*p*	adjusted r^2
summer water velocity	1	0.028	30.672	0.001	0.809
residual	6	0.001			

	log(penis mass at standard penis length)				
	df	MS	*F*	*p*	adjusted r^2
summer water velocity	1	0.114	69.613	<0.001	0.907
residual	6	0.002			

table S5. Field Survey regression statistics calculated on data standardized to first and third quartiles of penis length for ANCOVAs with interactions.

	log(penis basal width at 1st quartile of penis length)				
	df	MS	*F*	*p*	adjusted r^2
water velocity (from leg lengths)	1	0.030	54.290	<0.001	0.884
residual	6	0.001			

	log(penis basal width at 3rd quartile of penis length)				
	df	MS	*F*	*p*	adjusted r^2
water velocity (from leg lengths)	1	0.045	55.337	<0.001	0.886
residual	6	0.001			

	log(penis mass at 1st quartile of penis length)				
	df	MS	*F*	*p*	adjusted r^2
water velocity (from leg lengths)	1	0.091	57.944	<0.001	0.891
residual	6	0.002			

	log(penis mass at 3rd quartile of penis length)				
	df	MS	*F*	*p*	adjusted r^2
water velocity (from leg lengths)	1	0.181	47.002	<0.001	0.868
residual	6	0.004			

table S6. Field Transplant ANCOVA statistics.

	Log10(penis length)				
	df	MS	*F*	*p*	
Log10(soma mass) (sm)	1	0.463	42.920	0.000	***
Growth environment (env)	1	0.167	15.460	0.000	***
Source population (source)	1	0.004	0.392	0.534	
sm x env	1	0.050	4.591	0.038	*
sm x source	1	0.000	0.001	0.979	
source x env	1	0.001	0.108	0.743	
Error	45	0.011			

	Log10(penis basal width)				
	df	MS	*F*	*p*	
Log10(penis length) (pl)	1	0.171	44.360	0.000	***
Growth environment (env)	1	0.045	11.565	0.001	**
Source population (source)	1	0.007	1.897	0.175	
pl x env	1	0.003	0.707	0.405	
pl x source	1	0.000	0.065	0.800	
source x env	1	0.002	0.577	0.452	
Error	46	0.004			

(*** p <0.001, ** p<0.01, * p<0.05)