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BIOCHEMICAL GENETIC INVESTIGATION OF THE GENUS *SEBASTES*

by

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INTRODUCTION

The genus Sebastes includes more than 65 recognized species in the Northeastern Pacific Ocean. The speciose nature of the genus and existence of a large number of sibling species makes the taxonomy especially difficult. Many of the discriminating quantitative characters overlap. As a result little is known of the evolutionary and phylogenetic history of the genus. A technique that has been increasingly applied to species problems such as encountered in Sebastes is biochemical genetics using electrophoresis. This technique is based on the naturally occurring distribution of genetic variants of proteins which allows a population or species to be characterized by its frequency of variants. Groups of individuals which share a common gene pool will have similar gene frequencies as determined by electrophoresis. However, if isolation between groups occurs, the isolates may develop significantly different frequencies. These gene frequency differences can be used as an effective tool to determine if non-interbreeding groups occur.

The purpose of this study was to collect and electrophoretically analyze as many of the species of Sebastes as could be obtained, to characterize each species biochemically, and to document taxonomic relationships. This report presents the initial analyses and the calculated gene frequencies for each species. Future manuscripts will deal with the evolutionary significance of the findings and the comparison of the relationships defined biochemically with those previously determined through meristic studies.

MATERIALS AND METHODS

Tissue samples for electrophoresis were collected by bottom trawling, angling, and scuba diving during the period 1977-1981. Muscle and liver tissue from each fish were used for the elctrophoretic analysis. Electrophoresis followed methods developed especially for Sebastes and outlined in previous reports (Wishard and Gunderson, 1981; Wishard et al., 1980).

The most common protein type found in Sebastes alutus was used as a standard for each electrophoretically detectable locus (with the exception of ME-1 and ME-2). S. pinniger was used as the standard for ME-1 and ME-2 because of the unusual pattern exhibited by S. alutus. The mobility of all other variants or alleles for any of the rockfish species was calculated relative to the S. alutus standard which was designated to have a mobility of 100. As an example, an allelic protein that migrated half as far as the common protein would be designated 50. In the case of multiple forms of the same enzyme, a number is attached to the protein abbreviation (Table 1).

To quantify the relationships between species, identity coefficients (I) (Nei, 1975) were calculated between all pairs of species. The coefficient ranges from one (for identical allele frequencies) to zero (for those which have no alleles shared in common). These values were used to construct a phenogram using the unweighted pair group method with arithmetic averages (UPGMA) (Sneath and Sokal, 1975).

Table 1. A list of the biochemical genetic loci analyzed in this study. The allelic mobilities observed for each locus and their designations are given.

Locus	Allelic Mobility									
	A	B	C	D	E	F	G	H	I	J
GPD	100	60	135	150		164	88	218	110	
PGM	100	80		120	135					
GPI-1	100	-129	371							
GPI-2	100	92	89	77		70	84			
6PGD	100	95	112	90			80			
MDH-1	100			94						
MDH-2	100	75	118	150	170					
ME-1	100	106	58	94		85	126	80		
AAT	100	75	60							
PMI	100		110	135	90		152	219		
SOD	100	72	132					45		
LDH	100	500	800							
LA-2	100		103	120	108		95	90		
ADH	-100	-75	-66	-125	-140	-43	0			
SDH	100	55	115		135	325	163	29	240	
IDH-1	100	80		64	77	88	110			
IDH-2	100	108	75	57	118	94	50	90		
FUM	100	75								
ME-2	100	95								
CK	100	88	120	70						
LGG	100	75	85	120	112	130		65	145	
ACO	100	88	70	75	106					
ADA-1	100	111	103	65						
ADA-2	100	70	105							
GAM-2	100	95	83	105						
GAP	-100	220	170							
GAM-1	-100	-175	-130	10						
ACP	100	70	114	145	90	95	120	130	40	

RESULTS AND DISCUSSION

Specimens from 44 species and 3 unidentified groups were obtained. A list of the species, the collection date, and the geographic area of the collection are given in Table 2. The 3 unidentifiable groups were described as "unknown" of the species that they most closely resembled meristically. Following this scheme, data for S. reedi (unknown), S. aleutianus (unknown), and S. ciliatus (unknown) were gathered.

A total of 28 presumptive genetic loci were screened. With the exception of ME-2 and MDH-1 all loci were polymorphic in at least one species. The loci screened and the observed alleles at each locus are given in Table 1. Gene frequency estimates for each group are given in Appendix 1. With the exception of several pairs which will be discussed later, nearly all the species could be individually characteriezed electrophoretically.

The phenogram is a useful beginning point to visualize the overall relationships and levels of similarity between the species of the genus Sebastes (Figure 1). Five species of the subgenus Sebastomus (Chen, 1971) cluster together and as a group are the least similar to the rest of the genus suggesting a separate lineage for this group. Also showing a low similarity to the rest of the genus are the species of alutus, polyspinis, ciliatus, and the unknown ciliatus group. However, these species do not form the tight grouping exhibited by the Sebastomus species. A third somewhat distinct groups is composed of aleutianus, aleutianus (unknown),

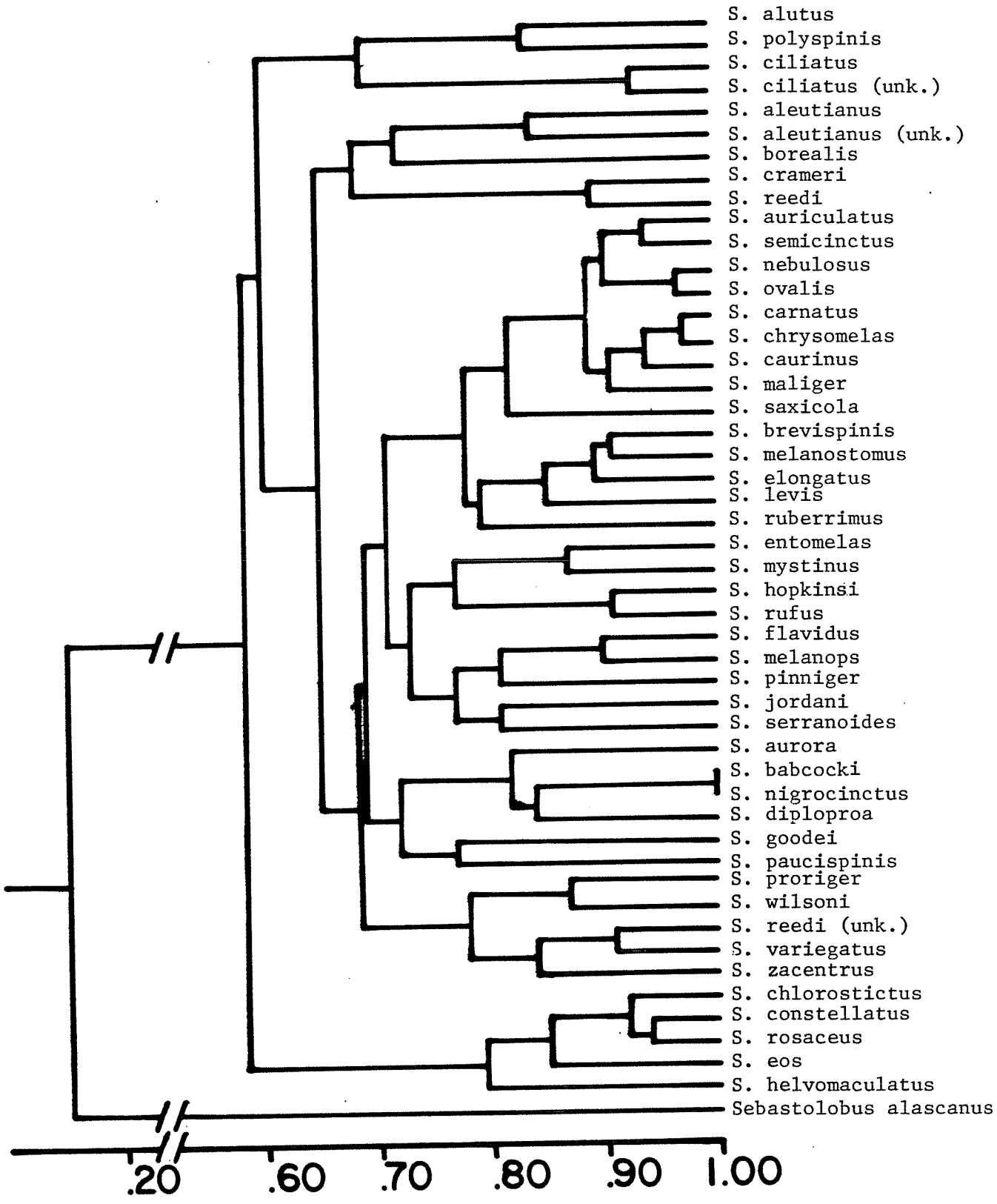
Table 2. A list of the species analyzed in this study, their collection dates, and the geographic areas where they were collected are given

Species	Collection Date	Geographic Area
Sebastes		
aleutianus	1978	Northeast Gulf of Alaska
aleutianus (unknown)	1978	Northeast Gulf of Alaska
	1979	Western Gulf of Alaska
alutus	1979	Washington Coast
auriculatus	1981	Northern California
aurora	1977	Northern California
	1977	Southern California
babcocki	1977	Southern California
	1978	Eastern Gulf of Alaska
	1977	Oregon Coast
borealis	1979	Western Gulf of Alaska
brevispinis	1977	Oregon Coast
	1978	Western Gulf of Alaska
carnatus	1978	Central California
caurinus	1978	Central California
	1981	Northern California
chlorostictus	1977	Oregon Coast
	1977	Southern California
chrysomelas	1978	Central California
ciliatus	1978	Eastern Gulf of Alaska
	1978	Central Gulf of Alaska
ciliatus (unknown)	1981	Kodiak Island
constellatus	1981	Northern California
crameri	1977	Oregon Coast
	1979	Washington Coast
diploproa	1977	Northern California
	1977	Oregon Coast
	1979	Washington Coast
elongatus	1977	Oregon Coast
	1979	Washington Coast
	1981	Northern California
entomelas	1977	California and Oregon Coasts
	1979	Washington Coast
	1981	Northern California
eos	1977	Southern California
flavidus	1977	Washington Coast
	1981	Northern California
goodei	1977	Southern California

Table 2. Continue.

Species	Collection Date	Geographic Area
Sebastes (continue)		
helvomaculatus	1977	Oregon Coast
hopkinisi	1977	Southern California
jordani	1977	Eastern Gulf of Alaska
	1977	Southern California
levis	1977	Southern California
maliger	1978	Washington Coast
	1980	Puget Sound
melanops	1977	Southern California
	1980	Washington Coast
	1978	Puget Sound
melanostomus	1977	Southern and Northern California
mystinus	1981	Northern California
	1978	Central California
nebulosus	1980	Washington Coast
ovalis	1981	Northern California
paucispinis	1977	Oregon Coast
pinniger	1979	Washington Coast
polyspinis	1978	Western Gulf of Alaska
proriger	1977	Washington Coast
	1977	Oregon Coast
reedi	1977	Oregon Coast
	1977	British Columbia Coast
reedi (unknown)	1978	Eastern Gulf of Alaska
rosaceus	1981	Northern California
ruberrimus	1981	Northern California
	1977	Oregon Coast
rufus	1977	Southern California
saxicola	1977	Washington Coast
	1977	Northern California
semicinctus	1977	Southern California
serranoides	1981	Northern California
variegatus	1978	Eastern Gulf of Alaska
zacentrus	1977	Washington Coast
	1979	Washington Coast
	1977	Oregon Coast
wilsoni	1977	Washington Coast
Sebastolobus		
alascanus	1978	Western Gulf of Alaska

Figure 1. A phenogram based on Nei's genetic identity (I) (Nei, 1975) is shown.



borealis, crameri, and reedi. Again, though, there is not a high degree of similarity within the group. The remainder of the species form various clusters at higher similarity levels.

Closely Related Species

Various pairs of species show a high degree of similarity to each other. Each pair will be discussed separately.

auriculatus/semicinctus

These species cluster together at approximately the .93 level. There are no fixed differences between these two species, but they do differ at a number of polymorphic loci. Frequency differences exist at the GPD, ME-1, PMI, LA-2, and ADH loci. These differences are of sufficient magnitude to identify individuals to species with a high probability level.

nebulosus/ovalis

These two species cluster together at approximately the .94 level. They differ in frequencies at two loci. However, only two individuals of nebulosus and one of ovalis were analyzed. More individuals should be screened before the potential to differentiate the two can be evaluated.

carnatus/chrysomelas

These two species have been the subject of a number of studies. They are sympatric species on the rocky reefs off the coast of California (Larson, 1980). Both are morphologically and ecologically very similar, and their specific status has occasionally been questioned (Larson, 1980). Electrophoretically they show significant differences at two loci (SDH and LA-2) and non-significant differences at five other loci (ADH, IDH-2, ME-1, PGM, and GPD). These differences indicate that there is a reduced

level of gene flow between the two sympatric groups. Individuals can likely be identified to species. A discriminat analysis or maximum likelihood type of analysis (Milner et al., 1980) could be used to produce a probability level associated with the identification.

constellatus/rosaceus

These two species show a genetic similarity of approximately .94. More individuals of both species should be analyzed to more accurately characterize each species. However, initial results indicate that there are significant differences at five loci (PGM, IDH-2, GAM-2, GAP, and GAM-1).

caurinus/auriculatus

The similarity relationship between S. caurinus and S. auriculatus are based on specimens collected from California. The two species from California are readily distinguishable at a large number of loci. Data not presented in this report, however, indicate that the species are much less clearly defined in the Puget Sound, Washington, region. Specimens meristically keyed out as S. auriculatus have genotypes characteristic of the S. caurinus type. The data suggest that there may be substantial introgression between S. auriculatus and S. caurinus in Puget Sound. Further Puget Sound specimens and a more thorough analysis are needed.

Biochemically Identical Species

Two species (S. nigrocinctus and S. babcocki) show identical biochemical genetic profiles. Meristically these species are readily distinguishable. Their biochemical identity likely results from the small

sample size of S. nigrocinctus (N=1). More specimens of S. nigrocintus would clarify the relationship and most likely indicate significant differences between the species.

Unknown Species

Three groups of Sebastes which could not be identified as any known species were collected by the National Marine Fisheries Service and the Alaska Department of Fish and Game biologists and forwarded to our laboratory. These groups were analyzed to determine if previously unidentified non-interbreeding groups of Sebastes existed.

ciliatus (unknown)

A number of smaller almost totally black Sebastes have been captured off the coast of Kodiak Island in the Western Gulf of Alaska. These individuals have been identified both as mystinus and ciliatus, however they lack the dusky color of ciliatus and are not within the established range of mystinus. They electrophoretically closely resemble S. ciliatus at every locus except ADH. The frequencies are as follows for the ADH locus:

	100	85	-140
ciliatus	.12	.85	.03
ciliatus (unknown)	1.00	.00	.00

Clearly there is little if any gene flow between the two groups. The ciliatus (unknown) group is likely an isolated gene pool of S. ciliatus that has diverged both electrophoretically and morphologically.

reedi (unknown)

A yellow-orange medium size rockfish collected off southeastern Alaska

resembles both S. reedi and S. alutus morphologically, but does not key out to either species. Samples of these fish were obtained and electrophoretically analyzed. Electrophoretically these fish show fixed and frequency differences when compared to both alutus and reedi. They most closely resemble S. variegatus and S. zacentrus, but show fixed differences between both species. The possibility that these Sebastes belong to a new species must be seriously considered.

aleutianus (unknown).

A heterogenous group of S. aleutianus was collected off Icy Bay in the northeastern portion of the Gulf of Alaska during 1978. Half of the group was the typical S. aleutianus type, while the other half was much darker around the head and mouth and had weaker head spines. Both groups were visually separated on the basis of morphology and color differences. Electrophoretically the two groups show fixed differences at the GAP, GAM-1, and ACP loci and significant frequency differences at the GPD, ME-1, PMI, and SDH loci. The unknown fish are clearly genetically isolated from the typical aleutianus type. A specimen of the unknown type is deposited in the College of Fisheries Museum, University of Washington.

Application of the Data

Effective management of a fish species can only occur when the biology of the species is understood, so that breeding groups can be the units of management. The biochemical genetic approach to the genus Sebastes clearly demonstrates that our understanding is far from complete concerning the Sebastes species complex. At least three previously unidentified isolated gene pools occur within the region.

The three isolated gene pools--closely related to S. aleutianus, S. ciliatus, and S. variegatus--are at levels of biochemical similarity at least as dissimilar or more dissimilar than currently recognized species. With a thorough meristic treatment, it is likely that these groups could be established as distinct species. Specimens of each of the unknown groups must be analyzed to determine what meristic characters can be used to identify the groups. An adequate number of S. ciliatus (unknown) specimens are available, but further collections of the S. reedi-S. variegatus (unknown) and S. aleutianus (unknown) types are needed. Both of these types could likely be gathered in a cruise of the Eastern Gulf of Alaska.

In addition to the theoretical and evolutionary significance of the data, the data have direct management applications. With the exceptions mentioned in the previous section, nearly every species analyzed has a unique biochemical genetic profile. The biochemical method can be used to verify identification of individuals to species and identify the existence of hybrids. Cases of introgression can also be recognized. The forensic applications are obvious and have been previously used by the National Marine Fisheries Service enforcement division.

Another important application of the data will be in juvenile identification. Sebastes species are especially difficult to identify as juveniles. Series of juveniles should be analyzed to determine the levels of activity of the differentiating systems and the minimal size necessary for identification. If trends follow that observed in other fish species, specimens of 2 cm or less can be accurately identified.

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APPENDIX 1. Tables of gene frequencies for the biochemical genetic loci surveyed for Sebastes. Refer to Table 1 of the text for allelic mobilities.

TABLE 1. ALLELE FREQUENCY ESTIMATES AT THE GPD LOCUS FOR SEBASTES

SPECIES	N	A	B	C	D	E	F	G	H	I	J
ALUTUS	999	.59	.41	0	0	0	0	0	0	0	0
ALEUTIANUS	23	01.00		0	0	0	0	0	0	0	0
ALEUTIANUS UNK.	23	01.00		0	0	0	0	0	0	0	0
AURICULATUS	10	0	0	01.00		0	0	0	0	0	0
AURORA	10	0	0	01.00		0	0	0	0	0	0
BABCOCKI	19	0	0	01.00		0	0	0	0	0	0
BOREALIS	12	0	01.00		0	0	0	0	0	0	0
BREVISPINIS	52	0	01.00		0	0	0	0	0	0	0
CARNATUS	29	.69	0	0	.31	0	0	0	0	0	0
CAURINUS WASH.	9	.22	0	0	.44	0	0	.33	0	0	0
CAURINUS CALIF.	18	.25	0	0	.47	0	0	.28	0	0	0
CHLOROSTICTUS	12	0	01.00		0	0	0	0	0	0	0
CHRYSOMELAS	24	.56	0	0	.44	0	0	0	0	0	0
CILIATUS	15	01.00		0	0	0	0	0	0	0	0
CILIATUS UNK.	17	01.00		0	0	0	0	0	0	0	0
CONSTELLATUS	6	0	0	01.00		0	0	0	0	0	0
CRAMERI	17	0	01.00		0	0	0	0	0	0	0
DIPLOPROA	10	0	0	01.00		0	0	0	0	0	0
ELONGATUS	22	0	01.00		0	0	0	0	0	0	0
ENTOMELAS	6	0	01.00		0	0	0	0	0	0	0
EOS	1	0	01.00		0	0	0	0	0	0	0
FLAVIDUS	10	0	01.00		0	0	0	0	0	0	0
GOODEI	12	0	0	01.00		0	0	0	0	0	0
HELVOMACULATUS	10	0	01.00		0	0	0	0	0	0	0
HOPKINSI	3	0	01.00		0	0	0	0	0	0	0
JORDANI	10	0	0	01.00		0	0	0	0	0	0
LEVIS	1	0	0	01.00		0	0	0	0	0	0
MALIGER	7	.50	.21	0	.29	0	0	0	0	0	0
MELANOPS	14	0	01.00		0	0	0	0	0	0	0
MELANOSTOMUS	11	1.00	0	0	0	0	0	0	0	0	0
MYSTINUS	12	0	01.00		0	0	0	0	0	0	0
NEBULOSUS	2	1.00	0	0	0	0	0	0	0	0	0
NIGROCINCTUS	1	0	0	01.00		0	0	0	0	0	0
OVALIS	1	1.00	0	0	0	0	0	0	0	0	0
PAUCISPINIS	12	0	0	01.00		0	0	0	0	0	0
PINNIGER	12	0	01.00		0	0	0	0	0	0	0
POLYSPINIS	30	01.00		0	0	0	0	0	0	0	0
PRORIGER	11	0	01.00		0	0	0	0	0	0	0
REEDI	27	0	01.00		0	0	0	0	0	0	0
REEDI UNKNOWN	4	0	01.00		0	0	0	0	0	0	0
ROSACEUS	3	0	0	01.00		0	0	0	0	0	0
RUBERRIMUS	4	.13	0	.88	0	0	0	0	0	0	0
RUFUS	5	0	01.00		0	0	0	0	0	0	0
SAXICOLA	3	0	0	0	0	0	0	0	01.00		0
SEMICINCTUS	3	0	0	0	.67	0	.33	0	0	0	0
SERRANOIDES	14	0	0	01.00		0	0	0	0	0	0
VARIEGATUS	5	0	01.00		0	0	0	0	0	0	0
WILSONI	6	0	01.00		0	0	0	0	0	0	0
ZACENTRUS	14	0	01.00		0	0	0	0	0	0	0
SEBASTOLOBUS	12	0	0	0	0	0	0	01.00		0	0

TABLE 2. ALLELE FREQUENCY ESTIMATES AT THE PGM LOCUS FOR SEBASTES

SPECIES	N	A	B	C	D	E	F	G	H	I	J
ALUTUS	999	.51	.49	0	0	0	0	0	0	0	0
ALEUTIANUS	23	.91	.09	0	0	0	0	0	0	0	0
ALEUTIANUS UNK.	24	.98	.02	0	0	0	0	0	0	0	0
AURICULATUS	10	1.00	0	0	0	0	0	0	0	0	0
AURORA	10	1.00	0	0	0	0	0	0	0	0	0
BABCOCKI	9	1.00	0	0	0	0	0	0	0	0	0
BOREALIS	12	.29	.71	0	0	0	0	0	0	0	0
BREVISPINIS	53	.46	.54	0	0	0	0	0	0	0	0
CARNATUS	29	.98	.02	0	0	0	0	0	0	0	0
CAURINUS WASH.	9	1.00	0	0	0	0	0	0	0	0	0
CAURINUS CALIF.	19	1.00	0	0	0	0	0	0	0	0	0
CHLOROSTICTUS	6	.17	0	0	.83	0	0	0	0	0	0
CHRYSOMELAS	24	1.00	0	0	0	0	0	0	0	0	0
CILIATUS	15	.43	.57	0	0	0	0	0	0	0	0
CILIATUS UNK.	15	.10	.90	0	0	0	0	0	0	0	0
CONSTELLATUS	9	.33	0	0	.67	0	0	0	0	0	0
CRAMERI	6	.25	.75	0	0	0	0	0	0	0	0
DIPLOPROA	15	1.00	0	0	0	0	0	0	0	0	0
ELONGATUS	22	1.00	0	0	0	0	0	0	0	0	0
ENTOMELAS	11	1.00	0	0	0	0	0	0	0	0	0
EOS	1	0	0	0	1.00	0	0	0	0	0	0
FLAVIDUS	10	1.00	0	0	0	0	0	0	0	0	0
GOODEI	12	1.00	0	0	0	0	0	0	0	0	0
HELVOMACULATUS	10	.30	.05	0	.65	0	0	0	0	0	0
HOPKINSI	3	1.00	0	0	0	0	0	0	0	0	0
JORDANI	10	1.00	0	0	0	0	0	0	0	0	0
LEVIS	1	1.00	0	0	0	0	0	0	0	0	0
MALIGER	17	1.00	0	0	0	0	0	0	0	0	0
MELANOPS	14	.96	.04	0	0	0	0	0	0	0	0
MELANOSTOMUS	11	1.00	0	0	0	0	0	0	0	0	0
MYSTINUS	11	.95	.05	0	0	0	0	0	0	0	0
NEBULOSUS	2	1.00	0	0	0	0	0	0	0	0	0
NIGROCINCTUS		NO DATA									
OVALIS	1	1.00	0	0	0	0	0	0	0	0	0
PAUCISPINIS	12	1.00	0	0	0	0	0	0	0	0	0
PINNIGER	12	.96	.04	0	0	0	0	0	0	0	0
POLYSPINIS	30	.42	.58	0	0	0	0	0	0	0	0
PRORIGER	5	.10	.90	0	0	0	0	0	0	0	0
REEDI	16	0	1.00	0	0	0	0	0	0	0	0
REEDI UNKNOWN	4	1.00	0	0	0	0	0	0	0	0	0
ROSACEUS	3	0	0	0	1.00	0	0	0	0	0	0
RUBERRIMUS	1	1.00	0	0	0	0	0	0	0	0	0
RUFUS	5	1.00	0	0	0	0	0	0	0	0	0
SAXICOLA	8	.88	.13	0	0	0	0	0	0	0	0
SEMICINCTUS	3	1.00	0	0	0	0	0	0	0	0	0
SERRANOIDES	14	.93	.07	0	0	0	0	0	0	0	0
VARIEGATUS	5	1.00	0	0	0	0	0	0	0	0	0
WILSONI	9	0	0	0	1.00	0	0	0	0	0	0
ZACENTRUS	13	1.00	0	0	0	0	0	0	0	0	0
SEBASTOLOBUS	3	0	0	0	.17	.83	0	0	0	0	0

TABLE 3. ALLELE FREQUENCY ESTIMATES AT THE GPI1 LOCUS FOR SEBASTES

SPECIES	N	A	B	C	D	E	F	G	H	I	J
ALUTUS	999	1.00	0	0	0	0	0	0	0	0	0
ALEUTIANUS	23	1.00	0	0	0	0	0	0	0	0	0
ALEUTIANUS UNK.	24	1.00	0	0	0	0	0	0	0	0	0
AURICULATUS	10	1.00	0	0	0	0	0	0	0	0	0
AURORA	10	1.00	0	0	0	0	0	0	0	0	0
BABCOCKI	7	1.00	0	0	0	0	0	0	0	0	0
BOREALIS	12	1.00	0	0	0	0	0	0	0	0	0
BREVISPINIS	55	1.00	0	0	0	0	0	0	0	0	0
CARNATUS	29	1.00	0	0	0	0	0	0	0	0	0
CAURINUS WASH.	9	1.00	0	0	0	0	0	0	0	0	0
CAURINUS CALIF.	19	1.00	0	0	0	0	0	0	0	0	0
CHLOROSTICTUS	6	1.00	0	0	0	0	0	0	0	0	0
CHRYSOMELAS	24	1.00	0	0	0	0	0	0	0	0	0
CILIATUS	15	1.00	0	0	0	0	0	0	0	0	0
CILIATUS UNK.	17	1.00	0	0	0	0	0	0	0	0	0
CONSTELLATUS	9	1.00	0	0	0	0	0	0	0	0	0
CRAMERI	17	1.00	0	0	0	0	0	0	0	0	0
DIPLOPROA	15	1.00	0	0	0	0	0	0	0	0	0
ELONGATUS	21	1.00	0	0	0	0	0	0	0	0	0
ENTOMELAS	11	1.00	0	0	0	0	0	0	0	0	0
EOS	1	1.00	0	0	0	0	0	0	0	0	0
FLAVIDUS	10	01.00	0	0	0	0	0	0	0	0	0
GOODEI	12	1.00	0	0	0	0	0	0	0	0	0
HELVOMACULATUS	10	1.00	0	0	0	0	0	0	0	0	0
HOPKINSI	3	1.00	0	0	0	0	0	0	0	0	0
JORDANI	10	1.00	0	0	0	0	0	0	0	0	0
LEVIS	1	1.00	0	0	0	0	0	0	0	0	0
MALIGER	17	1.00	0	0	0	0	0	0	0	0	0
MELANOPS	14	01.00	0	0	0	0	0	0	0	0	0
MELANOSTOMUS	10	1.00	0	0	0	0	0	0	0	0	0
MYSTINUS	11	1.00	0	0	0	0	0	0	0	0	0
NEBULOSUS	2	1.00	0	0	0	0	0	0	0	0	0
NIGROCINCTUS	1	1.00	0	0	0	0	0	0	0	0	0
OVALIS	1	1.00	0	0	0	0	0	0	0	0	0
PAUCISPINIS	4	.75	.25	0	0	0	0	0	0	0	0
PINNIGER	12	0	01.00	0	0	0	0	0	0	0	0
POLYSPINIS	30	1.00	0	0	0	0	0	0	0	0	0
PRORIGER	11	1.00	0	0	0	0	0	0	0	0	0
REEDI	16	1.00	0	0	0	0	0	0	0	0	0
REEDI UNKNOWN	4	1.00	0	0	0	0	0	0	0	0	0
ROSACEUS	3	1.00	0	0	0	0	0	0	0	0	0
RUBERRIMUS	4	1.00	0	0	0	0	0	0	0	0	0
RUFUS	5	1.00	0	0	0	0	0	0	0	0	0
SAXICOLA	10	1.00	0	0	0	0	0	0	0	0	0
SEMICINCTUS	3	1.00	0	0	0	0	0	0	0	0	0
SERRANOIDES	14	01.00	0	0	0	0	0	0	0	0	0
VARIEGATUS	5	1.00	0	0	0	0	0	0	0	0	0
WILSONI	9	1.00	0	0	0	0	0	0	0	0	0
ZACENTRUS	13	1.00	0	0	0	0	0	0	0	0	0
SEBASTOLOBUS	12	0	01.00	0	0	0	0	0	0	0	0

TABLE 4. ALLELE FREQUENCY ESTIMATES AT THE GPI2 LOCUS FOR SEBASTES

SPECIES	N	A	B	C	D	E	F	G	H	I	J
ALUTUS	999	1.00	0	0	0	0	0	0	0	0	0
ALEUTIANUS	23	0	01.00		0	0	0	0	0	0	0
ALEUTIANUS UNK.	24	0	01.00		0	0	0	0	0	0	0
AURICULATUS	10	0	01.00		0	0	0	0	0	0	0
AURORA	3	.17	0	.83	0	0	0	0	0	0	0
BABCOCKI	9	0	01.00		0	0	0	0	0	0	0
BOREALIS	3	0	01.00		0	0	0	0	0	0	0
BREVISPINIS	53	.02	0	.93	.04	0	.01	0	0	0	0
CARNATUS	29	0	01.00		0	0	0	0	0	0	0
CAURINUS WASH.	9	0	01.00		0	0	0	0	0	0	0
CAURINUS CALIF.	19	0	01.00		0	0	0	0	0	0	0
CHLOROSTICTUS	12	0	01.00		0	0	0	0	0	0	0
CHRYSOMELAS	24	0	01.00		0	0	0	0	0	0	0
CILIATUS	15	0	01.00		0	0	0	0	0	0	0
CILIATUS UNK.	17	0	01.00		0	0	0	0	0	0	0
CONSTELLATUS	9	0	01.00		0	0	0	0	0	0	0
CRAMERI	17	0	01.00		0	0	0	0	0	0	0
DIPLOPROA	15	0	01.00		0	0	0	0	0	0	0
ELONGATUS	22	0	01.00		0	0	0	0	0	0	0
ENTOMELAS	11	0	01.00		0	0	0	0	0	0	0
EOS	1	0	01.00		0	0	0	0	0	0	0
FLAVIDUS	10	0	01.00		0	0	0	0	0	0	0
GOODEI	12	0	01.00		0	0	0	0	0	0	0
HELVOMACULATUS	10	0	01.00		0	0	0	0	0	0	0
HOPKINSI	3	0	01.00		0	0	0	0	0	0	0
JORDANI	10	0	01.00		0	0	0	0	0	0	0
LEVIS	1	0	01.00		0	0	0	0	0	0	0
MALIGER	17	0	0	.97	.03	0	0	0	0	0	0
MELANOPS	14	0	01.00		0	0	0	0	0	0	0
MELANOSTOMUS	3	.17	0	.83	0	0	0	0	0	0	0
MYSTINUS	11	0	01.00		0	0	0	0	0	0	0
NEBULOSUS	2	0	01.00		0	0	0	0	0	0	0
NIGROCINCTUS	1	0	01.00		0	0	0	0	0	0	0
OVALIS	1	0	01.00		0	0	0	0	0	0	0
PAUCISPINIS	12	0	01.00		0	0	0	0	0	0	0
PINNIGER	12	0	01.00		0	0	0	0	0	0	0
POLYSPINIS	30	0	.93	0	0	0	0	.07	0	0	0
PRORIGER	11	0	0	01.00		0	0	0	0	0	0
REEDI	16	0	0	.97	0	0	0	.03	0	0	0
REEDI UNKNOWN	4	0	0	.63	.38	0	0	0	0	0	0
ROSACEUS	3	0	01.00		0	0	0	0	0	0	0
RUBERRIMUS	4	0	01.00		0	0	0	0	0	0	0
RUFUS	5	0	01.00		0	0	0	0	0	0	0
SAXICOLA	10	0	01.00		0	0	0	0	0	0	0
SEMICINCTUS	3	0	01.00		0	0	0	0	0	0	0
SERRANOIDES	14	0	01.00		0	0	0	0	0	0	0
VARIEGATUS	5	0	01.00		0	0	0	0	0	0	0
WILSONI	9	0	01.00		0	0	0	0	0	0	0
ZACENTRUS	3	0	0	.83	.17	0	0	0	0	0	0
SEBASTOLOBUS	12	.04	0	.96	0	0	0	0	0	0	0

TABLE 5. ALLELE FREQUENCY ESTIMATES AT THE 6PGD LOCUS FOR SEBASTES

SPECIES	N	A	B	C	D	E	F	G	H	I	J
ALUTUS	999	.99	.01	0	0	0	0	0	0	0	0
ALEUTIANUS	13	.81	0	.04	.04	0	0	.12	0	0	0
ALEUTIANUS UNK.	23	1.00	0	0	0	0	0	0	0	0	0
AURICULATUS	2	0	0	1.00	0	0	0	0	0	0	0
AURORA	10	0	0	1.00	0	0	0	0	0	0	0
BABCOCKI	12	0	0	1.00	0	0	0	0	0	0	0
BOREALIS	12	1.00	0	0	0	0	0	0	0	0	0
BREVISPINIS	54	.01	0	.99	0	0	0	0	0	0	0
CARNATUS	29	0	0	1.00	0	0	0	0	0	0	0
CAURINUS WASH.	3	0	0	1.00	0	0	0	0	0	0	0
CAURINUS CALIF.	10	0	0	1.00	0	0	0	0	0	0	0
CHLOROSTICTUS	12	0	0	1.00	0	0	0	0	0	0	0
CHRYSOMELAS	24	0	0	1.00	0	0	0	0	0	0	0
CILIATUS	15	.40	0	.60	0	0	0	0	0	0	0
CILIATUS UNK.	16	.59	0	.38	.03	0	0	0	0	0	0
CONSTELLATUS	7	0	0	1.00	0	0	0	0	0	0	0
CRAMERI	15	0	0	1.00	0	0	0	0	0	0	0
DIPLOPROA	13	0	0	1.00	0	0	0	0	0	0	0
ELONGATUS	12	0	0	1.00	0	0	0	0	0	0	0
ENTOMELAS	4	0	0	1.00	0	0	0	0	0	0	0
EOS		NO DATA									
FLAVIDUS	8	0	0	.25	.75	0	0	0	0	0	0
GOODEI	12	0	0	1.00	0	0	0	0	0	0	0
HELVOMACULATUS	10	0	0	1.00	0	0	0	0	0	0	0
HOPKINSI	3	0	0	1.00	0	0	0	0	0	0	0
JORDANI	10	0	0	1.00	0	0	0	0	0	0	0
LEVIS	1	0	0	1.00	0	0	0	0	0	0	0
MALIGER	5	0	0	.90	.10	0	0	0	0	0	0
MELANOPS	14	0	0	.18	.82	0	0	0	0	0	0
MELANOSTOMUS	11	0	0	1.00	0	0	0	0	0	0	0
MYSTINUS	8	0	0	1.00	0	0	0	0	0	0	0
NEBULOSUS	2	0	0	1.00	0	0	0	0	0	0	0
NIGROCINCTUS		NO DATA									
OVALIS	1	0	0	1.00	0	0	0	0	0	0	0
PAUCISPINIS	12	0	0	1.00	0	0	0	0	0	0	0
PINNIGER	12	0	0	1.00	0	0	0	0	0	0	0
POLYSPINIS	28	0	0	1.00	0	0	0	0	0	0	0
PRORIGER	11	0	0	1.00	0	0	0	0	0	0	0
REEDI	27	0	0	1.00	0	0	0	0	0	0	0
REEDI UNKNOWN	4	0	0	1.00	0	0	0	0	0	0	0
ROSACEUS	2	0	0	1.00	0	0	0	0	0	0	0
RUBERRIMUS	6	0	.92	0	0	0	0	.08	0	0	0
RUFUS	5	0	0	1.00	0	0	0	0	0	0	0
SAXICOLA	10	0	0	1.00	0	0	0	0	0	0	0
SEMICINCTUS	3	0	0	1.00	0	0	0	0	0	0	0
SERRANOIDES	5	0	0	1.00	0	0	0	0	0	0	0
VARIEGATUS		NO DATA									
WILSONI	9	0	0	1.00	0	0	0	0	0	0	0
ZACENTRUS	14	.04	0	.96	0	0	0	0	0	0	0
SEBASTOLOBUS		NO DATA									

TABLE 6. ALLELE FREQUENCY ESTIMATES AT THE MDH1 LOCUS FOR SEBASTES

SPECIES	N	A	B	C	D	E	F	G	H	I	J
ALUTUS	999	1.00	0	0	0	0	0	0	0	0	0
ALEUTIANUS	23	1.00	0	0	0	0	0	0	0	0	0
ALEUTIANUS UNK.	24	1.00	0	0	0	0	0	0	0	0	0
AURICULATUS	10	1.00	0	0	0	0	0	0	0	0	0
AURORA	10	1.00	0	0	0	0	0	0	0	0	0
BABCOCKI	19	1.00	0	0	0	0	0	0	0	0	0
BOREALIS	12	1.00	0	0	0	0	0	0	0	0	0
BREVISPINIS	52	1.00	0	0	0	0	0	0	0	0	0
CARNATUS	29	1.00	0	0	0	0	0	0	0	0	0
CAURINUS WASH.	9	1.00	0	0	0	0	0	0	0	0	0
CAURINUS CALIF.	19	1.00	0	0	0	0	0	0	0	0	0
CHLOROSTICTUS	12	1.00	0	0	0	0	0	0	0	0	0
CHRYSOMELAS	24	1.00	0	0	0	0	0	0	0	0	0
CILIATUS	15	1.00	0	0	0	0	0	0	0	0	0
CILIATUS UNK.	17	1.00	0	0	0	0	0	0	0	0	0
CONSTELLATUS	6	1.00	0	0	0	0	0	0	0	0	0
CRAMERI	17	1.00	0	0	0	0	0	0	0	0	0
DIPLOPROA	10	1.00	0	0	0	0	0	0	0	0	0
ELONGATUS	22	1.00	0	0	0	0	0	0	0	0	0
ENTOMELAS	7	1.00	0	0	0	0	0	0	0	0	0
EOS	1	1.00	0	0	0	0	0	0	0	0	0
FLAVIDUS	10	1.00	0	0	0	0	0	0	0	0	0
GOODEI	12	1.00	0	0	0	0	0	0	0	0	0
HELVOMACULATUS	10	1.00	0	0	0	0	0	0	0	0	0
HOPKINSI	3	1.00	0	0	0	0	0	0	0	0	0
JORDANI	10	1.00	0	0	0	0	0	0	0	0	0
LEVIS	1	1.00	0	0	0	0	0	0	0	0	0
MALIGER	17	1.00	0	0	0	0	0	0	0	0	0
MELANOPS	14	1.00	0	0	0	0	0	0	0	0	0
MELANOSTOMUS	12	1.00	0	0	0	0	0	0	0	0	0
MYSTINUS	12	1.00	0	0	0	0	0	0	0	0	0
NEBULOSUS	2	1.00	0	0	0	0	0	0	0	0	0
NIGROCINCTUS	1	1.00	0	0	0	0	0	0	0	0	0
OVALIS	1	1.00	0	0	0	0	0	0	0	0	0
PAUCISPINIS	12	1.00	0	0	0	0	0	0	0	0	0
PINNIGER	12	1.00	0	0	0	0	0	0	0	0	0
POLYSPINIS	30	1.00	0	0	0	0	0	0	0	0	0
PRORIGER	11	1.00	0	0	0	0	0	0	0	0	0
REEDI	27	1.00	0	0	0	0	0	0	0	0	0
REEDI UNKNOWN	4	1.00	0	0	0	0	0	0	0	0	0
ROSACEUS	3	1.00	0	0	0	0	0	0	0	0	0
RUBERRIMUS	4	1.00	0	0	0	0	0	0	0	0	0
RUFUS	5	1.00	0	0	0	0	0	0	0	0	0
SAXICOLA	14	1.00	0	0	0	0	0	0	0	0	0
SEMICINCTUS	3	1.00	0	0	0	0	0	0	0	0	0
SERRANOIDES	14	1.00	0	0	0	0	0	0	0	0	0
VARIEGATUS	5	1.00	0	0	0	0	0	0	0	0	0
WILSONI	9	1.00	0	0	0	0	0	0	0	0	0
ZACENTRUS	16	1.00	0	0	0	0	0	0	0	0	0
SEBASTOLOBUS	12	0	0	01.00		0	0	0	0	0	0

TABLE 7. ALLELE FREQUENCY ESTIMATES AT THE MDH2 LOCUS FOR SEBASTES

SPECIES	N	A	B	C	D	E	F	G	H	I	J
ALUTUS	999	1.00	0	0	0	0	0	0	0	0	0
ALEUTIANUS	23	01.00		0	0	0	0	0	0	0	0
ALEUTIANUS UNK.	24	01.00		0	0	0	0	0	0	0	0
AURICULATUS	10	1.00	0	0	0	0	0	0	0	0	0
AURORA	10	1.00	0	0	0	0	0	0	0	0	0
BABCOCKI	19	1.00	0	0	0	0	0	0	0	0	0
BOREALIS	12	01.00		0	0	0	0	0	0	0	0
BREVISPINIS	52	1.00	0	0	0	0	0	0	0	0	0
CARNATUS	29	1.00	0	0	0	0	0	0	0	0	0
CAURINUS WASH.	9	1.00	0	0	0	0	0	0	0	0	0
CAURINUS CALIF.	19	1.00	0	0	0	0	0	0	0	0	0
CHLOROSTICTUS	12	01.00		0	0	0	0	0	0	0	0
CHRYSOMELAS	24	1.00	0	0	0	0	0	0	0	0	0
CILIATUS	15	1.00	0	0	0	0	0	0	0	0	0
CILIATUS UNK.	17	1.00	0	0	0	0	0	0	0	0	0
CONSTELLATUS	6	01.00		0	0	0	0	0	0	0	0
CRAMERI	17	1.00	0	0	0	0	0	0	0	0	0
DIPLOPROA	10	1.00	0	0	0	0	0	0	0	0	0
ELONGATUS	22	1.00	0	0	0	0	0	0	0	0	0
ENTOMELAS	7	1.00	0	0	0	0	0	0	0	0	0
EOS	1	01.00		0	0	0	0	0	0	0	0
FLAVIDUS	10	1.00	0	0	0	0	0	0	0	0	0
GOODEI	12	1.00	0	0	0	0	0	0	0	0	0
HELVOMACULATUS	10	01.00		0	0	0	0	0	0	0	0
HOPKINSI	3	1.00	0	0	0	0	0	0	0	0	0
JORDANI	10	1.00	0	0	0	0	0	0	0	0	0
LEVIS	1	1.00	0	0	0	0	0	0	0	0	0
MALIGER	17	.97	0	.03	0	0	0	0	0	0	0
MELANOPS	14	1.00	0	0	0	0	0	0	0	0	0
MELANOSTOMUS	12	1.00	0	0	0	0	0	0	0	0	0
MYSTINUS	12	1.00	0	0	0	0	0	0	0	0	0
NEBULOSUS	2	1.00	0	0	0	0	0	0	0	0	0
NIGROCINCTUS	1	1.00	0	0	0	0	0	0	0	0	0
OVALIS	1	1.00	0	0	0	0	0	0	0	0	0
PAUCISPINIS	12	01.00		0	0	0	0	0	0	0	0
PINNIGER	12	1.00	0	0	0	0	0	0	0	0	0
POLYSPINIS	30	1.00	0	0	0	0	0	0	0	0	0
PRORIGER	11	1.00	0	0	0	0	0	0	0	0	0
REEDI	27	1.00	0	0	0	0	0	0	0	0	0
REEDI UNKNOWN	4	1.00	0	0	0	0	0	0	0	0	0
ROSACEUS	3	01.00		0	0	0	0	0	0	0	0
RUBERRIMUS	4	1.00	0	0	0	0	0	0	0	0	0
RUFUS	5	1.00	0	0	0	0	0	0	0	0	0
SAXICOLA	10	1.00	0	0	0	0	0	0	0	0	0
SEMICINCTUS	3	1.00	0	0	0	0	0	0	0	0	0
SERRANOIDES	14	1.00	0	0	0	0	0	0	0	0	0
VARIEGATUS	5	1.00	0	0	0	0	0	0	0	0	0
WILSONI	9	1.00	0	0	0	0	0	0	0	0	0
ZACENTRUS	14	1.00	0	0	0	0	0	0	0	0	0
SEBASTOLOBUS	3	0	0	0	.83	.17	0	0	0	0	0

TABLE 8. ALLELE FREQUENCY ESTIMATES AT THE ME1 LOCUS FOR SEBASTES

SPECIES	N	A	B	C	D	E	F	G	H	I	J
ALUTUS	999	01.00		0	0	0	0	0	0	0	0
ALEUTIANUS	23	.93	0	0	0	0	.07	0	0	0	0
ALEUTIANUS UNK.	19	1.00	0	0	0	0	0	0	0	0	0
AURICULATUS	3	.67	0	0	0	0	0	.33	0	0	0
AURORA	10	01.00		0	0	0	0	0	0	0	0
BABCOCKI	19	01.00		0	0	0	0	0	0	0	0
BOREALIS	2	.50	.50	0	0	0	0	0	0	0	0
BREVISPINIS	56	01.00		0	0	0	0	0	0	0	0
CARNATUS	29	.98	.02	0	0	0	0	0	0	0	0
CAURINUS WASH.	9	1.00	0	0	0	0	0	0	0	0	0
CAURINUS CALIF.	19	1.00	0	0	0	0	0	0	0	0	0
CHLOROSTICTUS	12	1.00	0	0	0	0	0	0	0	0	0
CHRYSOMELAS	24	1.00	0	0	0	0	0	0	0	0	0
CILIATUS	6	.67	.33	0	0	0	0	0	0	0	0
CILIATUS UNK.		NO DATA									
CONSTELLATUS	5	1.00	0	0	0	0	0	0	0	0	0
CRAMERI	17	1.00	0	0	0	0	0	0	0	0	0
DIPLOPROA	15	01.00		0	0	0	0	0	0	0	0
ELONGATUS	22	01.00		0	0	0	0	0	0	0	0
ENTOMELAS	11	01.00		0	0	0	0	0	0	0	0
EOS	1	1.00	0	0	0	0	0	0	0	0	0
FLAVIDUS	10	01.00		0	0	0	0	0	0	0	0
GOODEI	12	1.00	0	0	0	0	0	0	0	0	0
HELVOMACULATUS	10	1.00	0	0	0	0	0	0	0	0	0
HOPKINSI	3	1.00	0	0	0	0	0	0	0	0	0
JORDANI		NO DATA									
LEVIS	1	01.00		0	0	0	0	0	0	0	0
MALIGER	3	1.00	0	0	0	0	0	0	0	0	0
MELANOPS	14	01.00		0	0	0	0	0	0	0	0
MELANOSTOMUS	12	.04	.92	0	.04	0	0	0	0	0	0
MYSTINUS	8	01.00		0	0	0	0	0	0	0	0
NEBULOSUS	2	1.00	0	0	0	0	0	0	0	0	0
NIGROCINCTUS		NO DATA									
OVALIS	1	1.00	0	0	0	0	0	0	0	0	0
PAUCISPINIS	12	1.00	0	0	0	0	0	0	0	0	0
PINNIGER	12	.92	.04	.04	0	0	0	0	0	0	0
POLYSPINIS	3	01.00		0	0	0	0	0	0	0	0
PRORIGER	11	1.00	0	0	0	0	0	0	0	0	0
REEDI	26	1.00	0	0	0	0	0	0	0	0	0
REEDI UNKNOWN	4	1.00	0	0	0	0	0	0	0	0	0
ROSACEUS	3	1.00	0	0	0	0	0	0	0	0	0
RUBERRIMUS	4	01.00		0	0	0	0	0	0	0	0
RUFUS	5	1.00	0	0	0	0	0	0	0	0	0
SAXICOLA	14	1.00	0	0	0	0	0	0	0	0	0
SEMICINCTUS	3	1.00	0	0	0	0	0	0	0	0	0
SERRANOIDES	14	01.00		0	0	0	0	0	0	0	0
VARIEGATUS	5	1.00	0	0	0	0	0	0	0	0	0
WILSONI	9	1.00	0	0	0	0	0	0	0	0	0
ZACENTRUS	16	1.00	0	0	0	0	0	0	0	0	0
SEBASTOLOBUS	3	0	0	0	.33	0	0	0	.67	0	0

TABLE 9. ALLELE FREQUENCY ESTIMATES AT THE AAT LOCUS FOR SEBASTES

SPECIES	N	A	B	C	D	E	F	G	H	I	J
ALUTUS	999	.99	0	.01	0	0	0	0	0	0	0
ALEUTIANUS	21	1.00	0	0	0	0	0	0	0	0	0
ALEUTIANUS UNK.	24	1.00	0	0	0	0	0	0	0	0	0
AURICULATUS		NO DATA									
AURORA	10	01.00		0	0	0	0	0	0	0	0
BABCOCKI	11	01.00		0	0	0	0	0	0	0	0
BOREALIS	12	1.00	0	0	0	0	0	0	0	0	0
BREVISPINIS	39	1.00	0	0	0	0	0	0	0	0	0
CARNATUS	29	1.00	0	0	0	0	0	0	0	0	0
CAURINUS WASH.		NO DATA									
CAURINUS CALIF.	10	1.00	0	0	0	0	0	0	0	0	0
CHLOROSTICTUS	12	1.00	0	0	0	0	0	0	0	0	0
CHRYSOMELAS	24	1.00	0	0	0	0	0	0	0	0	0
CILIATUS	6	01.00		0	0	0	0	0	0	0	0
CILIATUS UNK.		NO DATA									
CONSTELLATUS		NO DATA									
CRAMERI	14	1.00	0	0	0	0	0	0	0	0	0
DIPLOPROA	13	01.00		0	0	0	0	0	0	0	0
ELONGATUS	12	1.00	0	0	0	0	0	0	0	0	0
ENTOMELAS	3	01.00		0	0	0	0	0	0	0	0
EOS		NO DATA									
FLAVIDUS	10	01.00		0	0	0	0	0	0	0	0
GOODEI	12	01.00		0	0	0	0	0	0	0	0
HELVOMACULATUS	10	1.00	0	0	0	0	0	0	0	0	0
HOPKINSI	1	1.00	0	0	0	0	0	0	0	0	0
JORDANI		NO DATA									
LEVIS	1	1.00	0	0	0	0	0	0	0	0	0
MALIGER		NO DATA									
MELANOPS		NO DATA									
MELANOSTOMUS		NO DATA									
MYSTINUS	1	01.00		0	0	0	0	0	0	0	0
NEBULOSUS	2	1.00	0	0	0	0	0	0	0	0	0
NIGROCINCTUS		NO DATA									
OVALIS		NO DATA									
PAUCISPINIS	12	01.00		0	0	0	0	0	0	0	0
PINNIGER	3	01.00		0	0	0	0	0	0	0	0
POLYSPINIS		NO DATA									
PRORIGER	11	01.00		0	0	0	0	0	0	0	0
REEDI	16	1.00	0	0	0	0	0	0	0	0	0
REEDI UNKNOWN	4	01.00		0	0	0	0	0	0	0	0
ROSACEUS		NO DATA									
RUBERRIMUS	6	1.00	0	0	0	0	0	0	0	0	0
RUFUS	4	1.00	0	0	0	0	0	0	0	0	0
SAXICOLA	14	1.00	0	0	0	0	0	0	0	0	0
SEMICINCTUS	2	1.00	0	0	0	0	0	0	0	0	0
SERRANOIDES		NO DATA									
VARIEGATUS		NO DATA									
WILSONI	5	01.00		0	0	0	0	0	0	0	0
ZACENTRUS	13	01.00		0	0	0	0	0	0	0	0
SEBASTOLOBUS		NO DATA									

TABLE 10. ALLELE FREQUENCY ESTIMATES AT THE PMI LOCUS FOR SEBASTES

SPECIES	N	A	B	C	D	E	F	G	H	I	J
ALUTUS	999	1.00	0	0	0	0	0	0	0	0	0
ALEUTIANUS	23	.20	0	0	.80	0	0	0	0	0	0
ALEUTIANUS UNK.	24	.85	0	0	.15	0	0	0	0	0	0
AURICULATUS	10	.95	0	0	.05	0	0	0	0	0	0
AURORA	10	0	0	01.00		0	0	0	0	0	0
BABCOCKI	19	0	0	0	0	0	01.00		0	0	0
BOREALIS	12	.96	0	0	.04	0	0	0	0	0	0
BREVISPINIS	52	1.00	0	0	0	0	0	0	0	0	0
CARNATUS	29	1.00	0	0	0	0	0	0	0	0	0
CAURINUS WASH.	9	1.00	0	0	0	0	0	0	0	0	0
CAURINUS CALIF.	19	1.00	0	0	0	0	0	0	0	0	0
CHLOROSTICTUS	12	0	0	01.00		0	0	0	0	0	0
CHRYSOMELAS	24	1.00	0	0	0	0	0	0	0	0	0
CILIATUS	15	1.00	0	0	0	0	0	0	0	0	0
CILIATUS UNK.	17	1.00	0	0	0	0	0	0	0	0	0
CONSTELLATUS	6	0	0	01.00		0	0	0	0	0	0
CRAMERI	12	.46	0	0	0	.54	0	0	0	0	0
DIPLOPROA	10	0	0	0	0	0	01.00		0	0	0
ELONGATUS	22	0	0	01.00		0	0	0	0	0	0
ENTOMELAS	11	0	0	01.00		0	0	0	0	0	0
EOS	1	0	0	01.00		0	0	0	0	0	0
FLAVIDUS	10	0	0	01.00		0	0	0	0	0	0
GOODEI	12	0	0	01.00		0	0	0	0	0	0
HELVOMACULATUS	10	0	0	01.00		0	0	0	0	0	0
HOPKINSI	3	.17	0	0	.83	0	0	0	0	0	0
JORDANI	10	0	0	0	.90	0	0	.10	0	0	0
LEVIS	1	0	0	01.00		0	0	0	0	0	0
MALIGER	14	1.00	0	0	0	0	0	0	0	0	0
MELANOPS	14	0	0	01.00		0	0	0	0	0	0
MELANOSTOMUS	12	1.00	0	0	0	0	0	0	0	0	0
MYSTINUS	11	0	01.00		0	0	0	0	0	0	0
NEBULOSUS	2	1.00	0	0	0	0	0	0	0	0	0
NIGROCINCTUS	1	0	0	0	0	0	01.00		0	0	0
OVALIS	1	1.00	0	0	0	0	0	0	0	0	0
PAUCISPINIS	12	0	0	01.00		0	0	0	0	0	0
PINNIGER	12	0	01.00		0	0	0	0	0	0	0
POLYSPINIS	30	.93	0	0	0	.07	0	0	0	0	0
PRORIGER	11	0	0	01.00		0	0	0	0	0	0
REEDI	27	0	0	0	01.00		0	0	0	0	0
REEDI UNKNOWN	4	0	0	0	.38	0	0	.63	0	0	0
ROSACEUS	3	0	0	01.00		0	0	0	0	0	0
RUBERRIMUS	4	.25	0	0	.75	0	0	0	0	0	0
RUFUS	5	1.00	0	0	0	0	0	0	0	0	0
SAXICOLA	12	1.00	0	0	0	0	0	0	0	0	0
SEMICINCTUS	3	1.00	0	0	0	0	0	0	0	0	0
SERRANOIDES	14	0	0	01.00		0	0	0	0	0	0
VARIEGATUS	5	0	0	01.00		0	0	0	0	0	0
WILSONI	9	0	0	01.00		0	0	0	0	0	0
ZACENTRUS	11	0	0	0	0	0	01.00		0	0	0
SEBASTOLOBUS	12	0	0	0	0	0	0	01.00		0	0

TABLE 11. ALLELE FREQUENCY ESTIMATES AT THE SOD LOCUS FOR SEBASTES

SPECIES	N	A	B	C	D	E	F	G	H	I	J
ALUTUS	999	1.00	0	0	0	0	0	0	0	0	0
ALEUTIANUS	23	0	01.00		0	0	0	0	0	0	0
ALEUTIANUS UNK.	24	0	01.00		0	0	0	0	0	0	0
AURICULATUS	10	0	01.00		0	0	0	0	0	0	0
AURORA	10	0	01.00		0	0	0	0	0	0	0
BABCOCKI	19	0	01.00		0	0	0	0	0	0	0
BOREALIS	12	1.00	0	0	0	0	0	0	0	0	0
BREVISPINIS	52	0	01.00		0	0	0	0	0	0	0
CARNATUS	29	0	01.00		0	0	0	0	0	0	0
CAURINUS WASH.	9	0	01.00		0	0	0	0	0	0	0
CAURINUS CALIF.	19	0	01.00		0	0	0	0	0	0	0
CHLOROSTICTUS	12	0	01.00		0	0	0	0	0	0	0
CHRYSOMELAS	24	0	01.00		0	0	0	0	0	0	0
CILIATUS	15	1.00	0	0	0	0	0	0	0	0	0
CILIATUS UNK.	17	1.00	0	0	0	0	0	0	0	0	0
CONSTELLATUS	4	0	01.00		0	0	0	0	0	0	0
CRAMERI	17	01.00		0	0	0	0	0	0	0	0
DIPLOPROA	15	0	01.00		0	0	0	0	0	0	0
ELONGATUS	22	0	01.00		0	0	0	0	0	0	0
ENTOMELAS	11	1.00	0	0	0	0	0	0	0	0	0
EOS	1	0	01.00		0	0	0	0	0	0	0
FLAVIDUS	10	1.00	0	0	0	0	0	0	0	0	0
GOODEI	12	1.00	0	0	0	0	0	0	0	0	0
HELVOMACULATUS	10	0	01.00		0	0	0	0	0	0	0
HOPKINSI	3	1.00	0	0	0	0	0	0	0	0	0
JORDANI	10	1.00	0	0	0	0	0	0	0	0	0
LEVIS	1	0	01.00		0	0	0	0	0	0	0
MALIGER	17	0	01.00		0	0	0	0	0	0	0
MELANOPS	14	1.00	0	0	0	0	0	0	0	0	0
MELANOSTOMUS	5	0	01.00		0	0	0	0	0	0	0
MYSTINUS	11	1.00	0	0	0	0	0	0	0	0	0
NEBULOSUS	2	.25	0	.75	0	0	0	0	0	0	0
NIGROCINCTUS	1	0	01.00		0	0	0	0	0	0	0
OVALIS	1	0	01.00		0	0	0	0	0	0	0
PAUCISPINIS	12	0	01.00		0	0	0	0	0	0	0
PINNIGER	12	1.00	0	0	0	0	0	0	0	0	0
POLYSPINIS	30	1.00	0	0	0	0	0	0	0	0	0
PRORIGER	11	1.00	0	0	0	0	0	0	0	0	0
REEDI	27	01.00		0	0	0	0	0	0	0	0
REEDI UNKNOWN	4	0	01.00		0	0	0	0	0	0	0
ROSACEUS	3	0	01.00		0	0	0	0	0	0	0
RUBERRIMUS	7	0	01.00		0	0	0	0	0	0	0
RUFUS	5	1.00	0	0	0	0	0	0	0	0	0
SAXICOLA	10	0	01.00		0	0	0	0	0	0	0
SEMICINCTUS	3	0	01.00		0	0	0	0	0	0	0
SERRANOIDES	14	1.00	0	0	0	0	0	0	0	0	0
VARIEGATUS	5	1.00	0	0	0	0	0	0	0	0	0
WILSONI	9	1.00	0	0	0	0	0	0	0	0	0
ZACENTRUS	14	0	01.00		0	0	0	0	0	0	0
SEBASTOLOBUS	12	0	0	0	0	0	0	01.00		0	0

TABLE 12. ALLELE FREQUENCY ESTIMATES AT THE LDH LOCUS FOR SEBASTES

SPECIES	N	A	B	C	D	E	F	G	H	I	J
ALUTUS	999	1.00	0	0	0	0	0	0	0	0	0
ALEUTIANUS	23	1.00	0	0	0	0	0	0	0	0	0
ALEUTIANUS UNK.	24	1.00	0	0	0	0	0	0	0	0	0
AURICULATUS	10	1.00	0	0	0	0	0	0	0	0	0
AURORA	10	1.00	0	0	0	0	0	0	0	0	0
BABCOCKI	19	1.00	0	0	0	0	0	0	0	0	0
BOREALIS	12	1.00	0	0	0	0	0	0	0	0	0
BREVISPINIS	56	1.00	0	0	0	0	0	0	0	0	0
CARNATUS	29	1.00	0	0	0	0	0	0	0	0	0
CAURINUS WASH.	9	1.00	0	0	0	0	0	0	0	0	0
CAURINUS CALIF.	19	1.00	0	0	0	0	0	0	0	0	0
CHLOROSTICTUS	12	0	1.00	0	0	0	0	0	0	0	0
CHRYSOMELAS	24	1.00	0	0	0	0	0	0	0	0	0
CILIATUS	15	1.00	0	0	0	0	0	0	0	0	0
CILIATUS UNK.	17	1.00	0	0	0	0	0	0	0	0	0
CONSTELLATUS	13	0	1.00	0	0	0	0	0	0	0	0
CRAMERI	17	1.00	0	0	0	0	0	0	0	0	0
DIPLOPROA	15	1.00	0	0	0	0	0	0	0	0	0
ELONGATUS	22	1.00	0	0	0	0	0	0	0	0	0
ENTOMELAS	11	1.00	0	0	0	0	0	0	0	0	0
EOS	1	0	1.00	0	0	0	0	0	0	0	0
FLAVIDUS	10	1.00	0	0	0	0	0	0	0	0	0
GOODEI	12	1.00	0	0	0	0	0	0	0	0	0
HELVOMACULATUS	10	0	1.00	0	0	0	0	0	0	0	0
HOPKINSI	3	1.00	0	0	0	0	0	0	0	0	0
JORDANI	10	1.00	0	0	0	0	0	0	0	0	0
LEVIS	1	1.00	0	0	0	0	0	0	0	0	0
MALIGER	12	1.00	0	0	0	0	0	0	0	0	0
MELANOPS	14	1.00	0	0	0	0	0	0	0	0	0
MELANOSTOMUS	12	1.00	0	0	0	0	0	0	0	0	0
MYSTINUS	17	1.00	0	0	0	0	0	0	0	0	0
NEBULOSUS	2	1.00	0	0	0	0	0	0	0	0	0
NIGROCINCTUS	1	1.00	0	0	0	0	0	0	0	0	0
OVALIS	1	1.00	0	0	0	0	0	0	0	0	0
PAUCISPINIS	12	1.00	0	0	0	0	0	0	0	0	0
PINNIGER	12	1.00	0	0	0	0	0	0	0	0	0
POLYSPINIS	30	1.00	0	0	0	0	0	0	0	0	0
PRORIGER	11	1.00	0	0	0	0	0	0	0	0	0
REEDI	26	1.00	0	0	0	0	0	0	0	0	0
REEDI UNKNOWN	4	1.00	0	0	0	0	0	0	0	0	0
ROSACEUS	3	0	1.00	0	0	0	0	0	0	0	0
RUBERRIMUS	7	1.00	0	0	0	0	0	0	0	0	0
RUFUS	5	1.00	0	0	0	0	0	0	0	0	0
SAXICOLA	14	1.00	0	0	0	0	0	0	0	0	0
SEMICINCTUS	3	1.00	0	0	0	0	0	0	0	0	0
SERRANOIDES	14	1.00	0	0	0	0	0	0	0	0	0
VARIEGATUS	5	1.00	0	0	0	0	0	0	0	0	0
WILSONI	9	1.00	0	0	0	0	0	0	0	0	0
ZACENTRUS	16	1.00	0	0	0	0	0	0	0	0	0
SEBASTOLOBUS	12	0	1.00	0	0	0	0	0	0	0	0

TABLE 13. ALLELE FREQUENCY ESTIMATES AT THE LA-2 LOCUS FOR SEBASTES

SPECIES	N	A	B	C	D	E	F	G	H	I	J
ALUTUS	999	1.00	0	0	0	0	0	0	0	0	0
ALEUTIANUS	3	0	01.00		0	0	0	0	0	0	0
ALEUTIANUS UNK.	23	.02	0	.98	0	0	0	0	0	0	0
AURICULATUS	10	.90	0	0	0	0	0	.10	0	0	0
AURORA	10	0	01.00		0	0	0	0	0	0	0
BABCOCKI	8	0	0	0	01.00		0	0	0	0	0
BOREALIS	12	1.00	0	0	0	0	0	0	0	0	0
BREVISPINIS	53	0	01.00		0	0	0	0	0	0	0
CARNATUS	3	0	0	0	0	0	01.00		0	0	0
CAURINUS WASH.	9	.11	0	0	0	0	0	.89	0	0	0
CAURINUS CALIF.	19	.13	0	0	0	0	0	.87	0	0	0
CHLOROSTICTUS	3	0	01.00		0	0	0	0	0	0	0
CHRYSOMELAS	3	.17	0	0	0	0	0	.83	0	0	0
CILIATUS	15	0	01.00		0	0	0	0	0	0	0
CILIATUS UNK.	17	0	01.00		0	0	0	0	0	0	0
CONSTELLATUS	6	0	01.00		0	0	0	0	0	0	0
CRAMERI	17	1.00	0	0	0	0	0	0	0	0	0
DIPLOPROA	10	0	01.00		0	0	0	0	0	0	0
ELONGATUS	22	0	0	.98	0	.02	0	0	0	0	0
ENTOMELAS	7	0	01.00		0	0	0	0	0	0	0
EOS	1	0	0	0	01.00		0	0	0	0	0
FLAVIDUS	10	0	01.00		0	0	0	0	0	0	0
GOODEI	12	0	01.00		0	0	0	0	0	0	0
HELVOMACULATUS	3	.33	0	.17	0	0	0	.50	0	0	0
HOPKINSI	3	0	01.00		0	0	0	0	0	0	0
JORDANI	10	0	0	0	01.00		0	0	0	0	0
LEVIS	1	0	01.00		0	0	0	0	0	0	0
MALIGER	9	.17	0	0	0	0	0	.83	0	0	0
MELANOPS	14	0	01.00		0	0	0	0	0	0	0
MELANOSTOMUS	9	0	01.00		0	0	0	0	0	0	0
MYSTINUS	7	0	0	.71	0	0	0	.29	0	0	0
NEBULOSUS	2	1.00	0	0	0	0	0	0	0	0	0
NIGROCINCTUS	1	0	0	0	01.00		0	0	0	0	0
OVALIS	1	1.00	0	0	0	0	0	0	0	0	0
PAUCISPINIS	3	0	01.00		0	0	0	0	0	0	0
PINNIGER	12	0	01.00		0	0	0	0	0	0	0
POLYSPINIS	30	.75	0	.25	0	0	0	0	0	0	0
PRORIGER	11	0	0	0	01.00		0	0	0	0	0
REEDI	27	0	01.00		0	0	0	0	0	0	0
REEDI UNKNOWN	4	0	0	0	01.00		0	0	0	0	0
ROSACEUS	3	0	01.00		0	0	0	0	0	0	0
RUBERRIMUS	4	1.00	0	0	0	0	0	0	0	0	0
RUFUS	4	0	0	.75	.25	0	0	0	0	0	0
SAXICOLA	10	1.00	0	0	0	0	0	0	0	0	0
SEMICINCTUS	2	.75	0	0	0	0	0	.25	0	0	0
SERRANOIDES	13	.04	0	.96	0	0	0	0	0	0	0
VARIEGATUS	3	0	0	0	01.00		0	0	0	0	0
WILSONI	9	0	0	0	01.00		0	0	0	0	0
ZACENTRUS	11	0	01.00		0	0	0	0	0	0	0
SEBASTOLOBUS	12	0	0	0	0	0	0	01.00		0	0

TABLE 14. ALLELE FREQUENCY ESTIMATES AT THE ADH LOCUS FOR SEBASTES

SPECIES	N	A	B	C	D	E	F	G	H	I	J
ALUTUS	999	.94	.06	0	0	0	0	0	0	0	0
ALEUTIANUS	23	1.00	0	0	0	0	0	0	0	0	0
ALEUTIANUS UNK.	24	1.00	0	0	0	0	0	0	0	0	0
AURICULATUS	10	.50	.50	0	0	0	0	0	0	0	0
AURORA	5	.30	.70	0	0	0	0	0	0	0	0
BABCOCKI	13	1.00	0	0	0	0	0	0	0	0	0
BOREALIS	12	1.00	0	0	0	0	0	0	0	0	0
BREVISPINIS	54	.98	.01	0	0	.01	0	0	0	0	0
CARNATUS	29	.98	0	.02	0	0	0	0	0	0	0
CAURINUS WASH.	8	1.00	0	0	0	0	0	0	0	0	0
CAURINUS CALIF.	19	1.00	0	0	0	0	0	0	0	0	0
CHLOROSTICTUS	2	1.00	0	0	0	0	0	0	0	0	0
CHRYSOMELAS	24	1.00	0	0	0	0	0	0	0	0	0
CILIATUS	13	.12	0	.85	0	.04	0	0	0	0	0
CILIATUS UNK.	17	1.00	0	0	0	0	0	0	0	0	0
CONSTELLATUS	5	1.00	0	0	0	0	0	0	0	0	0
CRAMERI	15	1.00	0	0	0	0	0	0	0	0	0
DIPLOPROA	13	1.00	0	0	0	0	0	0	0	0	0
ELONGATUS	13	1.00	0	0	0	0	0	0	0	0	0
ENTOMELAS	5	.60	0	0	0	.40	0	0	0	0	0
EOS	1	1.00	0	0	0	0	0	0	0	0	0
FLAVIDUS	10	1.00	0	0	0	0	0	0	0	0	0
GOODEI	12	0	0	0	0	01.00		0	0	0	0
HELVOMACULATUS	6	.25	.42	0	0	0	0	.33	0	0	0
HOPKINSI	3	.67	0	.33	0	0	0	0	0	0	0
JORDANI	3	1.00	0	0	0	0	0	0	0	0	0
LEVIS	1	1.00	0	0	0	0	0	0	0	0	0
MALIGER	9	.78	.22	0	0	0	0	0	0	0	0
MELANOPS	13	.96	.04	0	0	0	0	0	0	0	0
MELANOSTOMUS	9	1.00	0	0	0	0	0	0	0	0	0
MYSTINUS	8	1.00	0	0	0	0	0	0	0	0	0
NEBULOSUS	2	1.00	0	0	0	0	0	0	0	0	0
NIGROCINCTUS	1	1.00	0	0	0	0	0	0	0	0	0
OVALIS	1	1.00	0	0	0	0	0	0	0	0	0
PAUCISPINIS	12	0	0	.96	0	0	0	.04	0	0	0
PINNIGER	12	1.00	0	0	0	0	0	0	0	0	0
POLYSPINIS	30	.22	0	.78	0	0	0	0	0	0	0
PRORIGER	11	1.00	0	0	0	0	0	0	0	0	0
REEDI	16	1.00	0	0	0	0	0	0	0	0	0
REEDI UNKNOWN	4	1.00	0	0	0	0	0	0	0	0	0
ROSACEUS		NO DATA									
RUBERRIMUS	7	.64	0	0	.36	0	0	0	0	0	0
RUFUS	5	1.00	0	0	0	0	0	0	0	0	0
SAXICOLA	10	1.00	0	0	0	0	0	0	0	0	0
SEMICINCTUS	3	1.00	0	0	0	0	0	0	0	0	0
SERRANOIDES	14	1.00	0	0	0	0	0	0	0	0	0
VARIEGATUS	5	1.00	0	0	0	0	0	0	0	0	0
WILSONI	9	1.00	0	0	0	0	0	0	0	0	0
ZACENTRUS	14	1.00	0	0	0	0	0	0	0	0	0
SEBASTOLOBUS		NO DATA									

TABLE 15. ALLELE FREQUENCY ESTIMATES AT THE SDH LOCUS FOR SEBASTES

SPECIES	N	A	B	C	D	E	F	G	H	I	J
ALUTUS	999	1.00	0	0	0	0	0	0	0	0	0
ALEUTIANUS	23	0	.65	0	0	.35	0	0	0	0	0
ALEUTIANUS UNK.	24	0	0	0	0	.44	0	0	0	.56	0
AURICULATUS	5	0	0	.20	0	.80	0	0	0	0	0
AURORA		NO DATA									
BABCOCKI	9	0	0	0	0	0	0	0	01.00		0
BOREALIS	12	0	0	0	01.00		0	0	0	0	0
BREVISPINIS		NO DATA									
CARNATUS	25	.44	.08	0	0	.44	0	.04	0	0	0
CAURINUS WASH.		NO DATA									
CAURINUS CALIF.	9	.72	0	0	0	.06	0	.22	0	0	0
CHLOROSTICTUS	12	01.00		0	0	0	0	0	0	0	0
CHRYSOMELAS	22	.20	0	0	0	.80	0	0	0	0	0
CILIATUS	15	1.00	0	0	0	0	0	0	0	0	0
CILIATUS UNK.		NO DATA									
CONSTELLATUS		NO DATA									
CRAMERI		NO DATA									
DIPLOPROA	11	0	0	0	0	0	.50	0	0	.50	0
ELONGATUS	1	0	0	0	01.00		0	0	0	0	0
ENTOMELAS	4	01.00		0	0	0	0	0	0	0	0
EOS	1	01.00		0	0	0	0	0	0	0	0
FLAVIDUS	3	0	0	0	01.00		0	0	0	0	0
GOODEI		NO DATA									
HELVOMACULATUS		NO DATA									
HOPKINSI		NO DATA									
JORDANI		NO DATA									
LEVIS		NO DATA									
MALIGER		NO DATA									
MELANOPS	3	0	0	0	01.00		0	0	0	0	0
MELANOSTOMUS	6	0	0	0	01.00		0	0	0	0	0
MYSTINUS	1	01.00		0	0	0	0	0	0	0	0
NEBULOSUS	2	0	0	0	01.00		0	0	0	0	0
NIGROCINCTUS		NO DATA									
OVALIS		NO DATA									
PAUCISPINIS		NO DATA									
PINNIGER	1	0	0	0	01.00		0	0	0	0	0
POLYSPINIS		NO DATA									
PRORIGER	11	0	0	0	01.00		0	0	0	0	0
REEDI		NO DATA									
REEDI UNKNOWN		NO DATA									
ROSACEUS		NO DATA									
RUBERRIMUS	3	0	.17	0	0	.83	0	0	0	0	0
RUFUS	5	01.00		0	0	0	0	0	0	0	0
SAXICOLA	3	.17	0	0	0	.67	0	0	.17	0	0
SEMICINCTUS		NO DATA									
SERRANOIDES	14	0	.93	0	0	.07	0	0	0	0	0
VARIEGATUS		NO DATA									
WILSONI		NO DATA									
ZACENTRUS	3	0	0	0	01.00		0	0	0	0	0
SEBASTOLOBUS		NO DATA									

TABLE 16. ALLELE FREQUENCY ESTIMATES AT THE IDH1 LOCUS FOR SEBASTES

SPECIES	N	A	B	C	D	E	F	G	H	I	J
ALUTUS	999	1.00	0	0	0	0	0	0	0	0	0
ALEUTIANUS	23	1.00	0	0	0	0	0	0	0	0	0
ALEUTIANUS UNK.	24	1.00	0	0	0	0	0	0	0	0	0
AURICULATUS	10	1.00	0	0	0	0	0	0	0	0	0
AURORA	10	1.00	0	0	0	0	0	0	0	0	0
BABCOCKI	19	1.00	0	0	0	0	0	0	0	0	0
BOREALIS	12	1.00	0	0	0	0	0	0	0	0	0
BREVISPINIS	52	.99	.01	0	0	0	0	0	0	0	0
CARNATUS	29	1.00	0	0	0	0	0	0	0	0	0
CAURINUS WASH.	9	1.00	0	0	0	0	0	0	0	0	0
CAURINUS CALIF.	19	1.00	0	0	0	0	0	0	0	0	0
CHLOROSTICTUS	12	1.00	0	0	0	0	0	0	0	0	0
CHRYSOMELAS	24	1.00	0	0	0	0	0	0	0	0	0
CILIATUS	15	1.00	0	0	0	0	0	0	0	0	0
CILIATUS UNK.	17	1.00	0	0	0	0	0	0	0	0	0
CONSTELLATUS	6	1.00	0	0	0	0	0	0	0	0	0
CRAMERI	15	1.00	0	0	0	0	0	0	0	0	0
DIPLOPROA	15	1.00	0	0	0	0	0	0	0	0	0
ELONGATUS	10	.95	0	0	0	.05	0	0	0	0	0
ENTOMELAS	4	1.00	0	0	0	0	0	0	0	0	0
EOS	1	1.00	0	0	0	0	0	0	0	0	0
FLAVIDUS	10	1.00	0	0	0	0	0	0	0	0	0
GOODEI	12	1.00	0	0	0	0	0	0	0	0	0
HELVOMACULATUS	10	1.00	0	0	0	0	0	0	0	0	0
HOPKINSI	3	1.00	0	0	0	0	0	0	0	0	0
JORDANI	10	1.00	0	0	0	0	0	0	0	0	0
LEVIS	1	1.00	0	0	0	0	0	0	0	0	0
MALIGER	12	1.00	0	0	0	0	0	0	0	0	0
MELANOPS	15	1.00	0	0	0	0	0	0	0	0	0
MELANOSTOMUS	6	1.00	0	0	0	0	0	0	0	0	0
MYSTINUS	11	1.00	0	0	0	0	0	0	0	0	0
NEBULOSUS	2	1.00	0	0	0	0	0	0	0	0	0
NIGROCINCTUS	1	1.00	0	0	0	0	0	0	0	0	0
OVALIS	1	1.00	0	0	0	0	0	0	0	0	0
PAUCISPINIS	12	1.00	0	0	0	0	0	0	0	0	0
PINNIGER	12	1.00	0	0	0	0	0	0	0	0	0
POLYSPINIS	30	1.00	0	0	0	0	0	0	0	0	0
PRORIGER	11	.95	0	0	.05	0	0	0	0	0	0
REEDI	17	1.00	0	0	0	0	0	0	0	0	0
REEDI UNKNOWN	4	1.00	0	0	0	0	0	0	0	0	0
ROSACEUS	3	1.00	0	0	0	0	0	0	0	0	0
RUBERRIMUS	7	1.00	0	0	0	0	0	0	0	0	0
RUFUS	5	1.00	0	0	0	0	0	0	0	0	0
SAXICOLA	12	1.00	0	0	0	0	0	0	0	0	0
SEMICINCTUS	3	1.00	0	0	0	0	0	0	0	0	0
SERRANOIDES	14	.96	0	0	0	0	0	.04	0	0	0
VARIEGATUS	5	1.00	0	0	0	0	0	0	0	0	0
WILSONI	9	1.00	0	0	0	0	0	0	0	0	0
ZACENTRUS	11	1.00	0	0	0	0	0	0	0	0	0
SEBASTOLOBUS	12	0	0	0	0	0	1.00	0	0	0	0

TABLE 17. ALLELE FREQUENCY ESTIMATES AT THE IDH2 LOCUS FOR SEBASTES

SPECIES	N	A	B	C	D	E	F	G	H	I	J
ALUTUS	999	.99	0	0	.01	0	0	0	0	0	0
ALEUTIANUS	23	1.00	0	0	0	0	0	0	0	0	0
ALEUTIANUS UNK.	24	1.00	0	0	0	0	0	0	0	0	0
AURICULATUS	10	.90	0	0	0	.10	0	0	0	0	0
AURORA	10	0	01.00		0	0	0	0	0	0	0
BABCOCKI	13	0	01.00		0	0	0	0	0	0	0
BOREALIS	12	0	0	0	0	0	01.00		0	0	0
BREVISPINIS	55	.98	0	.01	0	0	.01	0	0	0	0
CARNATUS	29	0	0	0	01.00		0	0	0	0	0
CAURINUS WASH.	7	0	0	0	01.00		0	0	0	0	0
CAURINUS CALIF.	19	0	0	0	01.00		0	0	0	0	0
CHLOROSTICTUS	12	1.00	0	0	0	0	0	0	0	0	0
CHRYSOMELAS	24	.02	0	0	0	.98	0	0	0	0	0
CILIATUS	15	.97	0	.03	0	0	0	0	0	0	0
CILIATUS UNK.		NO DATA									
CONSTELLATUS	9	.94	0	0	0	.06	0	0	0	0	0
CRAMERI	15	1.00	0	0	0	0	0	0	0	0	0
DIPLOPROA	11	.82	0	.18	0	0	0	0	0	0	0
ELONGATUS	13	1.00	0	0	0	0	0	0	0	0	0
ENTOMELAS	5	1.00	0	0	0	0	0	0	0	0	0
EOS	1	1.00	0	0	0	0	0	0	0	0	0
FLAVIDUS	10	1.00	0	0	0	0	0	0	0	0	0
GOODEI	12	1.00	0	0	0	0	0	0	0	0	0
HELVOMACULATUS	10	0	0	0	0		01.00		0	0	0
HOPKINSI	3	0	01.00		0	0	0	0	0	0	0
JORDANI	10	.05	0	.95	0	0	0	0	0	0	0
LEVIS	1	1.00	0	0	0	0	0	0	0	0	0
MALIGER	17	.32	0	0	0	.68	0	0	0	0	0
MELANOPS	6	0	01.00		0	0	0	0	0	0	0
MELANOSTOMUS	9	.94	0	0	0	.06	0	0	0	0	0
MYSTINUS	3	0	0	0	01.00		0	0	0	0	0
NEBULOSUS	2	.50	0	0	0	.50	0	0	0	0	0
NIGROCINCTUS	1	0	01.00		0	0	0	0	0	0	0
OVALIS	1	0	0	0	01.00		0	0	0	0	0
PAUCISPINIS	3	.83	0	0	0	.17	0	0	0	0	0
PINNIGER	12	1.00	0	0	0	0	0	0	0	0	0
POLYSPINIS	30	1.00	0	0	0	0	0	0	0	0	0
PRORIGER	11	1.00	0	0	0	0	0	0	0	0	0
REEDI	16	1.00	0	0	0	0	0	0	0	0	0
REEDI UNKNOWN	4	1.00	0	0	0	0	0	0	0	0	0
ROSACEUS	3	1.00	0	0	0	0	0	0	0	0	0
RUBERRIMUS	7	.14	0	.86	0	0	0	0	0	0	0
RUFUS	5	1.00	0	0	0	0	0	0	0	0	0
SAXICOLA	10	1.00	0	0	0	0	0	0	0	0	0
SEMICINCTUS		NO DATA									
SERRANOIDES	2	.50	.25	0	0	0	0	0	.25	0	0
VARIEGATUS	5	1.00	0	0	0	0	0	0	0	0	0
WILSONI	9	1.00	0	0	0	0	0	0	0	0	0
ZACENTRUS	13	0	01.00		0	0	0	0	0	0	0
SEBASTOLOBUS	3	0	0	0	0	0	0	01.00		0	0

TABLE 18. ALLELE FREQUENCY ESTIMATES AT THE FUM LOCUS FOR SEBASTES

SPECIES	N	A	B	C	D	E	F	G	H	I	J
ALUTUS	999	1.00	0	0	0	0	0	0	0	0	0
ALEUTIANUS	3	1.00	0	0	0	0	0	0	0	0	0
ALEUTIANUS UNK.	2	1.00	0	0	0	0	0	0	0	0	0
AURICULATUS	10	1.00	0	0	0	0	0	0	0	0	0
AURORA	10	1.00	0	0	0	0	0	0	0	0	0
BABCOCKI	1	1.00	0	0	0	0	0	0	0	0	0
BOREALIS	5	1.00	0	0	0	0	0	0	0	0	0
BREVISPINIS	3	1.00	0	0	0	0	0	0	0	0	0
CARNATUS	5	1.00	0	0	0	0	0	0	0	0	0
CAURINUS WASH.	9	1.00	0	0	0	0	0	0	0	0	0
CAURINUS CALIF.	19	1.00	0	0	0	0	0	0	0	0	0
CHLOROSTICTUS	3	1.00	0	0	0	0	0	0	0	0	0
CHRYSOMELAS	24	1.00	0	0	0	0	0	0	0	0	0
CILIATUS	15	.97	.03	0	0	0	0	0	0	0	0
CILIATUS UNK.	17	1.00	0	0	0	0	0	0	0	0	0
CONSTELLATUS	6	1.00	0	0	0	0	0	0	0	0	0
CRAMERI	3	0	1.00	0	0	0	0	0	0	0	0
DIPLOPROA	3	1.00	0	0	0	0	0	0	0	0	0
ELONGATUS	4	1.00	0	0	0	0	0	0	0	0	0
ENTOMELAS	7	0	1.00	0	0	0	0	0	0	0	0
EOS	1	1.00	0	0	0	0	0	0	0	0	0
FLAVIDUS	10	1.00	0	0	0	0	0	0	0	0	0
GOODEI	12	1.00	0	0	0	0	0	0	0	0	0
HELVOMACULATUS	3	1.00	0	0	0	0	0	0	0	0	0
HOPKINSI	3	1.00	0	0	0	0	0	0	0	0	0
JORDANI	3	1.00	0	0	0	0	0	0	0	0	0
LEVIS	1	1.00	0	0	0	0	0	0	0	0	0
MALIGER	4	1.00	0	0	0	0	0	0	0	0	0
MELANOPS	7	1.00	0	0	0	0	0	0	0	0	0
MELANOSTOMUS	6	1.00	0	0	0	0	0	0	0	0	0
MYSTINUS	7	0	1.00	0	0	0	0	0	0	0	0
NEBULOSUS	2	1.00	0	0	0	0	0	0	0	0	0
NIGROCINCTUS	1	1.00	0	0	0	0	0	0	0	0	0
OVALIS	1	1.00	0	0	0	0	0	0	0	0	0
PAUCISPINIS	3	1.00	0	0	0	0	0	0	0	0	0
PINNIGER	12	1.00	0	0	0	0	0	0	0	0	0
POLYSPINIS	3	1.00	0	0	0	0	0	0	0	0	0
PRORIGER	3	1.00	0	0	0	0	0	0	0	0	0
REEDI	2	0	1.00	0	0	0	0	0	0	0	0
REEDI UNKNOWN	3	1.00	0	0	0	0	0	0	0	0	0
ROSACEUS	3	1.00	0	0	0	0	0	0	0	0	0
RUBERRIMUS	4	1.00	0	0	0	0	0	0	0	0	0
RUFUS	3	1.00	0	0	0	0	0	0	0	0	0
SAXICOLA	3	1.00	0	0	0	0	0	0	0	0	0
SEMICINCTUS	3	1.00	0	0	0	0	0	0	0	0	0
SERRANOIDES	14	1.00	0	0	0	0	0	0	0	0	0
VARIEGATUS	5	1.00	0	0	0	0	0	0	0	0	0
WILSONI	2	1.00	0	0	0	0	0	0	0	0	0
ZACENTRUS	9	1.00	0	0	0	0	0	0	0	0	0
SEBASTOLOBUS	NO DATA										

TABLE 19. ALLELE FREQUENCY ESTIMATES AT THE ME-2 LOCUS FOR SEBASTES

SPECIES	N	A	B	C	D	E	F	G	H	I	J
ALUTUS	999	01.00		0	0	0	0	0	0	0	0
ALEUTIANUS	23	1.00	0	0	0	0	0	0	0	0	0
ALEUTIANUS UNK.	19	1.00	0	0	0	0	0	0	0	0	0
AURICULATUS	10	1.00	0	0	0	0	0	0	0	0	0
AURORA	10	1.00	0	0	0	0	0	0	0	0	0
BABCOCKI	19	1.00	0	0	0	0	0	0	0	0	0
BOREALIS	12	1.00	0	0	0	0	0	0	0	0	0
BREVISPINIS	56	1.00	0	0	0	0	0	0	0	0	0
CARNATUS	29	1.00	0	0	0	0	0	0	0	0	0
CAURINUS WASH.	9	1.00	0	0	0	0	0	0	0	0	0
CAURINUS CALIF.	19	1.00	0	0	0	0	0	0	0	0	0
CHLOROSTICTUS	3	1.00	0	0	0	0	0	0	0	0	0
CHRYSOMELAS	24	1.00	0	0	0	0	0	0	0	0	0
CILIATUS	15	1.00	0	0	0	0	0	0	0	0	0
CILIATUS UNK.		NO DATA									
CONSTELLATUS	6	1.00	0	0	0	0	0	0	0	0	0
CRAMERI	17	1.00	0	0	0	0	0	0	0	0	0
DIPLOPROA	15	1.00	0	0	0	0	0	0	0	0	0
ELONGATUS	22	1.00	0	0	0	0	0	0	0	0	0
ENTOMELAS	11	1.00	0	0	0	0	0	0	0	0	0
EOS	1	1.00	0	0	0	0	0	0	0	0	0
FLAVIDUS	10	1.00	0	0	0	0	0	0	0	0	0
GOODEI	12	1.00	0	0	0	0	0	0	0	0	0
HELVOMACULATUS	3	1.00	0	0	0	0	0	0	0	0	0
HOPKINSI	3	1.00	0	0	0	0	0	0	0	0	0
JORDANI	10	1.00	0	0	0	0	0	0	0	0	0
LEVIS	1	1.00	0	0	0	0	0	0	0	0	0
MALIGER	7	1.00	0	0	0	0	0	0	0	0	0
MELANOPS	14	1.00	0	0	0	0	0	0	0	0	0
MELANOSTOMUS	12	1.00	0	0	0	0	0	0	0	0	0
MYSTINUS	17	1.00	0	0	0	0	0	0	0	0	0
NEBULOSUS	2	1.00	0	0	0	0	0	0	0	0	0
NIGROCINCTUS	1	1.00	0	0	0	0	0	0	0	0	0
OVALIS	1	1.00	0	0	0	0	0	0	0	0	0
PAUCISPINIS	12	1.00	0	0	0	0	0	0	0	0	0
PINNIGER	12	1.00	0	0	0	0	0	0	0	0	0
POLYSPINIS	3	01.00		0	0	0	0	0	0	0	0
PRORIGER	11	1.00	0	0	0	0	0	0	0	0	0
REEDI	26	1.00	0	0	0	0	0	0	0	0	0
REEDI UNKNOWN	4	1.00	0	0	0	0	0	0	0	0	0
ROSACEUS	3	1.00	0	0	0	0	0	0	0	0	0
RUBERRIMUS	4	1.00	0	0	0	0	0	0	0	0	0
RUFUS	5	1.00	0	0	0	0	0	0	0	0	0
SAXICOLA	14	1.00	0	0	0	0	0	0	0	0	0
SEMICINCTUS	3	1.00	0	0	0	0	0	0	0	0	0
SERRANOIDES	14	1.00	0	0	0	0	0	0	0	0	0
VARIEGATUS	5	1.00	0	0	0	0	0	0	0	0	0
WILSONI	9	1.00	0	0	0	0	0	0	0	0	0
ZACENTRUS	16	1.00	0	0	0	0	0	0	0	0	0
SEBASTOLOBUS		NO DATA									

TABLE 20. ALLELE FREQUENCY ESTIMATES AT THE CK LOCUS FOR SEBASTES

SPECIES	N	A	B	C	D	E	F	G	H	I	J
ALUTUS	999	1.00	0	0	0	0	0	0	0	0	0
ALEUTIANUS	23	1.00	0	0	0	0	0	0	0	0	0
ALEUTIANUS UNK.	24	1.00	0	0	0	0	0	0	0	0	0
AURICULATUS	10	1.00	0	0	0	0	0	0	0	0	0
AURORA	10	1.00	0	0	0	0	0	0	0	0	0
BABCOCKI	19	1.00	0	0	0	0	0	0	0	0	0
BOREALIS	12	1.00	0	0	0	0	0	0	0	0	0
BREVISPINIS	52	1.00	0	0	0	0	0	0	0	0	0
CARNATUS	29	1.00	0	0	0	0	0	0	0	0	0
CAURINUS WASH.	9	1.00	0	0	0	0	0	0	0	0	0
CAURINUS CALIF.	19	1.00	0	0	0	0	0	0	0	0	0
CHLOROSTICTUS	3	1.00	0	0	0	0	0	0	0	0	0
CHRYSOMELAS	24	1.00	0	0	0	0	0	0	0	0	0
CILIATUS	15	1.00	0	0	0	0	0	0	0	0	0
CILIATUS UNK.	17	1.00	0	0	0	0	0	0	0	0	0
CONSTELLATUS	10	1.00	0	0	0	0	0	0	0	0	0
CRAMERI	17	.94	.03	.03	0	0	0	0	0	0	0
DIPLOPROA	15	1.00	0	0	0	0	0	0	0	0	0
ELONGATUS	22	1.00	0	0	0	0	0	0	0	0	0
ENTOMELAS	11	0	1.00	0	0	0	0	0	0	0	0
EOS		NO DATA									
FLAVIDUS	10	1.00	0	0	0	0	0	0	0	0	0
GOODEI	12	1.00	0	0	0	0	0	0	0	0	0
HELVOMACULATUS	10	1.00	0	0	0	0	0	0	0	0	0
HOPKINSI	3	0	1.00	0	0	0	0	0	0	0	0
JORDANI	10	1.00	0	0	0	0	0	0	0	0	0
LEVIS	1	0	.50	0	.50	0	0	0	0	0	0
MALIGER	17	1.00	0	0	0	0	0	0	0	0	0
MELANOPS	14	1.00	0	0	0	0	0	0	0	0	0
MELANOSTOMUS	12	1.00	0	0	0	0	0	0	0	0	0
MYSTINUS	11	0	1.00	0	0	0	0	0	0	0	0
NEBULOSUS	2	1.00	0	0	0	0	0	0	0	0	0
NIGROCINCTUS	1	1.00	0	0	0	0	0	0	0	0	0
OVALIS	1	1.00	0	0	0	0	0	0	0	0	0
PAUCISPINIS	12	1.00	0	0	0	0	0	0	0	0	0
PINNIGER	12	1.00	0	0	0	0	0	0	0	0	0
POLYSPINIS	30	1.00	0	0	0	0	0	0	0	0	0
PRORIGER	11	1.00	0	0	0	0	0	0	0	0	0
REEDI	26	1.00	0	0	0	0	0	0	0	0	0
REEDI UNKNOWN	4	1.00	0	0	0	0	0	0	0	0	0
ROSACEUS	3	1.00	0	0	0	0	0	0	0	0	0
RUBERRIMUS	7	1.00	0	0	0	0	0	0	0	0	0
RUFUS	5	0	1.00	0	0	0	0	0	0	0	0
SAXICOLA	14	1.00	0	0	0	0	0	0	0	0	0
SEMICINCTUS	3	1.00	0	0	0	0	0	0	0	0	0
SERRANOIDES	14	1.00	0	0	0	0	0	0	0	0	0
VARIEGATUS	5	1.00	0	0	0	0	0	0	0	0	0
WILSONI	10	1.00	0	0	0	0	0	0	0	0	0
ZACENTRUS	16	1.00	0	0	0	0	0	0	0	0	0
SEBASTOLOBUS	12	1.00	0	0	0	0	0	0	0	0	0

TABLE 21. ALLELE FREQUENCY ESTIMATES AT THE LGG LOCUS FOR SEBASTES

SPECIES	N	A	B	C	D	E	F	G	H	I	J
ALUTUS	999	.99	0	0	0	0	.01	0	0	0	0
ALEUTIANUS	23	.98	0	.02	0	0	0	0	0	0	0
ALEUTIANUS UNK.	24	1.00	0	0	0	0	0	0	0	0	0
AURICULATUS	10	1.00	0	0	0	0	0	0	0	0	0
AURORA	10	0	0	1.00	0	0	0	0	0	0	0
BABCOCKI	19	1.00	0	0	0	0	0	0	0	0	0
BOREALIS	12	1.00	0	0	0	0	0	0	0	0	0
BREVISPINIS	56	1.00	0	0	0	0	0	0	0	0	0
CARNATUS	29	1.00	0	0	0	0	0	0	0	0	0
CAURINUS WASH.	9	.11	0	0	.89	0	0	0	0	0	0
CAURINUS CALIF.	19	.13	0	0	.87	0	0	0	0	0	0
CHLOROSTICTUS	12	1.00	0	0	0	0	0	0	0	0	0
CHRYSOMELAS	24	1.00	0	0	0	0	0	0	0	0	0
CILIATUS	15	1.00	0	0	0	0	0	0	0	0	0
CILIATUS UNK.	17	1.00	0	0	0	0	0	0	0	0	0
CONSTELLATUS	6	1.00	0	0	0	0	0	0	0	0	0
CRAMERI	17	1.00	0	0	0	0	0	0	0	0	0
DIPLOPROA	10	0	0	0	1.00	0	0	0	0	0	0
ELONGATUS	22	1.00	0	0	0	0	0	0	0	0	0
ENTOMELAS	7	0	0	0	1.00	0	0	0	0	0	0
EOS	1	1.00	0	0	0	0	0	0	0	0	0
FLAVIDUS	5	1.00	0	0	0	0	0	0	0	0	0
GOODEI	3	0	0	1.00	0	0	0	0	0	0	0
HELVOMACULATUS	10	1.00	0	0	0	0	0	0	0	0	0
HOPKINSI	3	1.00	0	0	0	0	0	0	0	0	0
JORDANI	10	.90	0	0	.10	0	0	0	0	0	0
LEVIS	1	1.00	0	0	0	0	0	0	0	0	0
MALIGER	9	.94	0	0	.06	0	0	0	0	0	0
MELANOPS	6	.58	0	0	.42	0	0	0	0	0	0
MELANOSTOMUS	11	1.00	0	0	0	0	0	0	0	0	0
MYSTINUS	7	.57	0	0	.43	0	0	0	0	0	0
NEBULOSUS	2	1.00	0	0	0	0	0	0	0	0	0
NIGROCINCTUS	1	1.00	0	0	0	0	0	0	0	0	0
OVALIS	1	1.00	0	0	0	0	0	0	0	0	0
PAUCISPINIS	3	0	.67	0	0	0	0	0	.33	0	0
PINNIGER	12	1.00	0	0	0	0	0	0	0	0	0
POLYSPINIS	30	1.00	0	0	0	0	0	0	0	0	0
PRORIGER	11	1.00	0	0	0	0	0	0	0	0	0
REEDI	16	1.00	0	0	0	0	0	0	0	0	0
REEDI UNKNOWN	4	1.00	0	0	0	0	0	0	0	0	0
ROSACEUS	3	1.00	0	0	0	0	0	0	0	0	0
RUBERRIMUS	4	1.00	0	0	0	0	0	0	0	0	0
RUFUS	5	1.00	0	0	0	0	0	0	0	0	0
SAXICOLA	10	1.00	0	0	0	0	0	0	0	0	0
SEMICINCTUS	3	1.00	0	0	0	0	0	0	0	0	0
SERRANOIDES	14	.68	0	0	0	.32	0	0	0	0	0
VARIEGATUS	5	1.00	0	0	0	0	0	0	0	0	0
WILSONI	9	1.00	0	0	0	0	0	0	0	0	0
ZACENTRUS	14	1.00	0	0	0	0	0	0	0	0	0
SEBASTOLOBUS	3	0	0	0	0	0	.83	0	0	.17	0

TABLE 22. ALLELE FREQUENCY ESTIMATES AT THE ACO LOCUS FOR SEBASTES

SPECIES	N	A	B	C	D	E	F	G	H	I	J
ALUTUS	999	1.00	0	0	0	0	0	0	0	0	0
ALEUTIANUS	5	0	0	0	01.00		0	0	0	0	0
ALEUTIANUS UNK.	6	0	0	0	01.00		0	0	0	0	0
AURICULATUS	10	01.00		0	0	0	0	0	0	0	0
AURORA	7	0	01.00		0	0	0	0	0	0	0
BABCOCKI		NO DATA									
BOREALIS	4	0	0	0	01.00		0	0	0	0	0
BREVISPINIS	50	1.00	0	0	0	0	0	0	0	0	0
CARNATUS	6	01.00		0	0	0	0	0	0	0	0
CAURINUS WASH.	9	01.00		0	0	0	0	0	0	0	0
CAURINUS CALIF.	19	01.00		0	0	0	0	0	0	0	0
CHLOROSTICTUS	3	01.00		0	0	0	0	0	0	0	0
CHRYSOMELAS	3	01.00		0	0	0	0	0	0	0	0
CILIATUS	3	1.00	0	0	0	0	0	0	0	0	0
CILIATUS UNK.		NO DATA									
CONSTELLATUS	9	01.00		0	0	0	0	0	0	0	0
CRAMERI	11	.18	0	0	0	.82	0	0	0	0	0
DIPLOPROA		NO DATA									
ELONGATUS	6	01.00		0	0	0	0	0	0	0	0
ENTOMELAS	1	01.00		0	0	0	0	0	0	0	0
EOS		NO DATA									
FLAVIDUS	3	01.00		0	0	0	0	0	0	0	0
GOODEI		NO DATA									
HELVOMACULATUS	6	01.00		0	0	0	0	0	0	0	0
HOPKINSI	3	01.00		0	0	0	0	0	0	0	0
JORDANI		NO DATA									
LEVIS	1	0	0	01.00		0	0	0	0	0	0
MALIGER	6	01.00		0	0	0	0	0	0	0	0
MELANOPS	3	0	01.00		0	0	0	0	0	0	0
MELANOSTOMUS		NO DATA									
MYSTINUS	6	01.00		0	0	0	0	0	0	0	0
NEBULOSUS	2	01.00		0	0	0	0	0	0	0	0
NIGROCINCTUS		NO DATA									
OVALIS	1	01.00		0	0	0	0	0	0	0	0
PAUCISPINIS		NO DATA									
PINNIGER	3	01.00		0	0	0	0	0	0	0	0
POLYSPINIS	3	1.00	0	0	0	0	0	0	0	0	0
PRORIGER	2	01.00		0	0	0	0	0	0	0	0
REEDI	5	0	0	0	01.00		0	0	0	0	0
REEDI UNKNOWN	3	1.00	0	0	0	0	0	0	0	0	0
ROSACEUS	3	01.00		0	0	0	0	0	0	0	0
RUBERRIMUS		NO DATA									
RUFUS	3	01.00		0	0	0	0	0	0	0	0
SAXICOLA	4	0	.50	0	0	.50	0	0	0	0	0
SEMICINCTUS		NO DATA									
SERRANOIDES	14	.54	.43	.04	0	0	0	0	0	0	0
VARIEGATUS	3	1.00	0	0	0	0	0	0	0	0	0
WILSONI	3	1.00	0	0	0	0	0	0	0	0	0
ZACENTRUS	4	1.00	0	0	0	0	0	0	0	0	0
SEBASTOLOBUS	3	.17	0	0	0	0	.83	0	0	0	0

TABLE 23. ALLELE FREQUENCY ESTIMATES AT THE ADA1 LOCUS FOR SEBASTES

SPECIES	N	A	B	C	D	E	F	G	H	I	J
ALUTUS	999	1.00	0	0	0	0	0	0	0	0	0
ALEUTIANUS	23	1.00	0	0	0	0	0	0	0	0	0
ALEUTIANUS UNK.	18	1.00	0	0	0	0	0	0	0	0	0
AURICULATUS	10	1.00	0	0	0	0	0	0	0	0	0
AURORA	7	1.00	0	0	0	0	0	0	0	0	0
BABCOCKI	12	1.00	0	0	0	0	0	0	0	0	0
BOREALIS	12	1.00	0	0	0	0	0	0	0	0	0
BREVISPINIS	14	1.00	0	0	0	0	0	0	0	0	0
CARNATUS	29	1.00	0	0	0	0	0	0	0	0	0
CAURINUS WASH.	9	1.00	0	0	0	0	0	0	0	0	0
CAURINUS CALIF.	19	1.00	0	0	0	0	0	0	0	0	0
CHLOROSTICTUS	12	1.00	0	0	0	0	0	0	0	0	0
CHRYSOMELAS	24	1.00	0	0	0	0	0	0	0	0	0
CILIATUS	15	0	0	1.00	0	0	0	0	0	0	0
CILIATUS UNK.	17	0	0	1.00	0	0	0	0	0	0	0
CONSTELLATUS	6	1.00	0	0	0	0	0	0	0	0	0
CRAMERI	3	1.00	0	0	0	0	0	0	0	0	0
DIPLOPROA	3	1.00	0	0	0	0	0	0	0	0	0
ELONGATUS	4	1.00	0	0	0	0	0	0	0	0	0
ENTOMELAS	7	1.00	0	0	0	0	0	0	0	0	0
EOS	1	0	0	1.00	0	0	0	0	0	0	0
FLAVIDUS	10	1.00	0	0	0	0	0	0	0	0	0
GOODEI	3	1.00	0	0	0	0	0	0	0	0	0
HELVOMACULATUS	2	.25	.75	0	0	0	0	0	0	0	0
HOPKINSI	3	1.00	0	0	0	0	0	0	0	0	0
JORDANI	10	.95	.05	0	0	0	0	0	0	0	0
LEVIS	1	1.00	0	0	0	0	0	0	0	0	0
MALIGER	9	1.00	0	0	0	0	0	0	0	0	0
MELANOPS	7	1.00	0	0	0	0	0	0	0	0	0
MELANOSTOMUS	11	1.00	0	0	0	0	0	0	0	0	0
MYSTINUS	7	1.00	0	0	0	0	0	0	0	0	0
NEBULOSUS	2	1.00	0	0	0	0	0	0	0	0	0
NIGROCINCTUS	1	1.00	0	0	0	0	0	0	0	0	0
OVALIS	1	1.00	0	0	0	0	0	0	0	0	0
PAUCISPINIS	12	1.00	0	0	0	0	0	0	0	0	0
PINNIGER	2	1.00	0	0	0	0	0	0	0	0	0
POLYSPINIS	3	1.00	0	0	0	0	0	0	0	0	0
PRORIGER	3	1.00	0	0	0	0	0	0	0	0	0
REEDI	12	1.00	0	0	0	0	0	0	0	0	0
REEDI UNKNOWN	3	1.00	0	0	0	0	0	0	0	0	0
ROSACEUS	3	1.00	0	0	0	0	0	0	0	0	0
RUBERRIMUS	4	1.00	0	0	0	0	0	0	0	0	0
RUFUS	5	1.00	0	0	0	0	0	0	0	0	0
SAXICOLA	3	1.00	0	0	0	0	0	0	0	0	0
SEMICINCTUS	3	1.00	0	0	0	0	0	0	0	0	0
SERRANOIDES	14	1.00	0	0	0	0	0	0	0	0	0
VARIEGATUS	3	1.00	0	0	0	0	0	0	0	0	0
WILSONI	3	.83	0	0	.17	0	0	0	0	0	0
ZACENTRUS	3	1.00	0	0	0	0	0	0	0	0	0
SEBASTOLOBUS	12	0	0	0	0	0	0	0	1.00	0	0

TABLE 24. ALLELE FREQUENCY ESTIMATES AT THE ADA2 LOCUS FOR SEBASTES

SPECIES	N	A	B	C	D	E	F	G	H	I	J
ALUTUS	999	.67	.33	0	0	0	0	0	0	0	0
ALEUTIANUS	23	1.00	0	0	0	0	0	0	0	0	0
ALEUTIANUS UNK.	20	1.00	0	0	0	0	0	0	0	0	0
AURICULATUS	10	1.00	0	0	0	0	0	0	0	0	0
AURORA	7	1.00	0	0	0	0	0	0	0	0	0
BABCOCKI	16	1.00	0	0	0	0	0	0	0	0	0
BOREALIS	12	.92	.08	0	0	0	0	0	0	0	0
BREVISPINIS	14	1.00	0	0	0	0	0	0	0	0	0
CARNATUS	29	1.00	0	0	0	0	0	0	0	0	0
CAURINUS WASH.	9	1.00	0	0	0	0	0	0	0	0	0
CAURINUS CALIF.	19	1.00	0	0	0	0	0	0	0	0	0
CHLOROSTICTUS	12	1.00	0	0	0	0	0	0	0	0	0
CHRYSOMELAS	24	1.00	0	0	0	0	0	0	0	0	0
CILIATUS	15	0	1.00	0	0	0	0	0	0	0	0
CILIATUS UNK.	17	0	1.00	0	0	0	0	0	0	0	0
CONSTELLATUS	6	1.00	0	0	0	0	0	0	0	0	0
CRAMERI	12	1.00	0	0	0	0	0	0	0	0	0
DIPLOPROA	10	1.00	0	0	0	0	0	0	0	0	0
ELONGATUS	13	1.00	0	0	0	0	0	0	0	0	0
ENTOMELAS	7	1.00	0	0	0	0	0	0	0	0	0
EOS	1	1.00	0	0	0	0	0	0	0	0	0
FLAVIDUS	10	1.00	0	0	0	0	0	0	0	0	0
GOODEI	3	1.00	0	0	0	0	0	0	0	0	0
HELVOMACULATUS	2	0	1.00	0	0	0	0	0	0	0	0
HOPKINSI	3	1.00	0	0	0	0	0	0	0	0	0
JORDANI	10	1.00	0	0	0	0	0	0	0	0	0
LEVIS	1	1.00	0	0	0	0	0	0	0	0	0
MALIGER	9	1.00	0	0	0	0	0	0	0	0	0
MELANOPS	7	1.00	0	0	0	0	0	0	0	0	0
MELANOSTOMUS	11	1.00	0	0	0	0	0	0	0	0	0
MYSTINUS	13	1.00	0	0	0	0	0	0	0	0	0
NEBULOSUS	2	1.00	0	0	0	0	0	0	0	0	0
NIGROCINCTUS	1	1.00	0	0	0	0	0	0	0	0	0
OVALIS	1	1.00	0	0	0	0	0	0	0	0	0
PAUCISPINIS	12	1.00	0	0	0	0	0	0	0	0	0
PINNIGER	2	1.00	0	0	0	0	0	0	0	0	0
POLYSPINIS	3	.50	.50	0	0	0	0	0	0	0	0
PRORIGER	11	0	1.00	0	0	0	0	0	0	0	0
REEDI	12	1.00	0	0	0	0	0	0	0	0	0
REEDI UNKNOWN	3	.50	.50	0	0	0	0	0	0	0	0
ROSACEUS	3	1.00	0	0	0	0	0	0	0	0	0
RUBERRIMUS	4	1.00	0	0	0	0	0	0	0	0	0
RUFUS	5	1.00	0	0	0	0	0	0	0	0	0
SAXICOLA	3	1.00	0	0	0	0	0	0	0	0	0
SEMICINCTUS	3	1.00	0	0	0	0	0	0	0	0	0
SERRANOIDES	14	1.00	0	0	0	0	0	0	0	0	0
VARIEGATUS	3	.50	.50	0	0	0	0	0	0	0	0
WILSONI	3	.33	.67	0	0	0	0	0	0	0	0
ZACENTRUS	3	.50	.50	0	0	0	0	0	0	0	0
SEBASTOLOBUS		NO DATA									

TABLE 25. ALLELE FREQUENCY ESTIMATES AT THE GAM2 LOCUS FOR SEBASTES

SPECIES	N	A	B	C	D	E	F	G	H	I	J
ALUTUS	999	1.00	0	0	0	0	0	0	0	0	0
ALEUTIANUS	23	1.00	0	0	0	0	0	0	0	0	0
ALEUTIANUS UNK.	24	1.00	0	0	0	0	0	0	0	0	0
AURICULATUS	10	1.00	0	0	0	0	0	0	0	0	0
AURORA		NO DATA									
BABCOCKI	6	01.00		0	0	0	0	0	0	0	0
BOREALIS	12	1.00	0	0	0	0	0	0	0	0	0
BREVISPINIS	13	1.00	0	0	0	0	0	0	0	0	0
CARNATUS	29	1.00	0	0	0	0	0	0	0	0	0
CAURINUS WASH.	9	1.00	0	0	0	0	0	0	0	0	0
CAURINUS CALIF.	19	1.00	0	0	0	0	0	0	0	0	0
CHLOROSTICTUS	11	01.00		0	0	0	0	0	0	0	0
CHRYSOMELAS	24	1.00	0	0	0	0	0	0	0	0	0
CILIATUS	15	0	0	01.00		0	0	0	0	0	0
CILIATUS UNK.	17	0	0	01.00		0	0	0	0	0	0
CONSTELLATUS	9	01.00		0	0	0	0	0	0	0	0
CRAMERI	15	.97	0	0	.03	0	0	0	0	0	0
DIPLOPROA	13	01.00		0	0	0	0	0	0	0	0
ELONGATUS	3	1.00	0	0	0	0	0	0	0	0	0
ENTOMELAS	4	1.00	0	0	0	0	0	0	0	0	0
EOS	1	01.00		0	0	0	0	0	0	0	0
FLAVIDUS	8	1.00	0	0	0	0	0	0	0	0	0
GOODEI		NO DATA									
HELVOMACULATUS	10	01.00		0	0	0	0	0	0	0	0
HOPKINSI	3	1.00	0	0	0	0	0	0	0	0	0
JORDANI	10	1.00	0	0	0	0	0	0	0	0	0
LEVIS	1	1.00	0	0	0	0	0	0	0	0	0
MALIGER	6	1.00	0	0	0	0	0	0	0	0	0
MELANOPS	5	1.00	0	0	0	0	0	0	0	0	0
MELANOSTOMUS	11	1.00	0	0	0	0	0	0	0	0	0
MYSTINUS	7	1.00	0	0	0	0	0	0	0	0	0
NEBULOSUS	2	1.00	0	0	0	0	0	0	0	0	0
NIGROCINCTUS	1	01.00		0	0	0	0	0	0	0	0
OVALIS	1	1.00	0	0	0	0	0	0	0	0	0
PAUCISPINIS	1	01.00		0	0	0	0	0	0	0	0
PINNIGER	3	1.00	0	0	0	0	0	0	0	0	0
POLYSPINIS	30	1.00	0	0	0	0	0	0	0	0	0
PRORIGER	11	1.00	0	0	0	0	0	0	0	0	0
REEDI	13	1.00	0	0	0	0	0	0	0	0	0
REEDI UNKNOWN	1	1.00	0	0	0	0	0	0	0	0	0
ROSACEUS	3	.33	.67	0	0	0	0	0	0	0	0
RUBERRIMUS	4	1.00	0	0	0	0	0	0	0	0	0
RUFUS	5	1.00	0	0	0	0	0	0	0	0	0
SAXICOLA	10	0		01.00		0	0	0	0	0	0
SEMICINCTUS	3	1.00	0	0	0	0	0	0	0	0	0
SERRANOIDES	14	1.00	0	0	0	0	0	0	0	0	0
VARIEGATUS	3	1.00	0	0	0	0	0	0	0	0	0
WILSONI	9	1.00	0	0	0	0	0	0	0	0	0
ZACENTRUS	14	1.00	0	0	0	0	0	0	0	0	0
SEBASTOLOBUS	3	0	0	01.00		0	0	0	0	0	0

TABLE 26. ALLELE FREQUENCY ESTIMATES AT THE GAP LOCUS FOR SEBASTES

SPECIES	N	A	B	C	D	E	F	G	H	I	J
ALUTUS	999	1.00	0	0	0	0	0	0	0	0	0
ALEUTIANUS	23	1.00	0	0	0	0	0	0	0	0	0
ALEUTIANUS UNK.	8	0	1.00	0	0	0	0	0	0	0	0
AURICULATUS	10	1.00	0	0	0	0	0	0	0	0	0
AURORA	10	1.00	0	0	0	0	0	0	0	0	0
BABCOCKI	7	1.00	0	0	0	0	0	0	0	0	0
BOREALIS	12	1.00	0	0	0	0	0	0	0	0	0
BREVISPINIS	52	1.00	0	0	0	0	0	0	0	0	0
CARNATUS	29	1.00	0	0	0	0	0	0	0	0	0
CAURINUS WASH.	9	1.00	0	0	0	0	0	0	0	0	0
CAURINUS CALIF.	10	1.00	0	0	0	0	0	0	0	0	0
CHLOROSTICTUS	3	0	1.00	0	0	0	0	0	0	0	0
CHRYSOMELAS	24	1.00	0	0	0	0	0	0	0	0	0
CILIATUS	15	1.00	0	0	0	0	0	0	0	0	0
CILIATUS UNK.	17	1.00	0	0	0	0	0	0	0	0	0
CONSTELLATUS	9	.33	.67	0	0	0	0	0	0	0	0
CRAMERI	12	1.00	0	0	0	0	0	0	0	0	0
DIPLOPROA	15	1.00	0	0	0	0	0	0	0	0	0
ELONGATUS	22	1.00	0	0	0	0	0	0	0	0	0
ENTOMELAS	11	1.00	0	0	0	0	0	0	0	0	0
EOS	1	0	1.00	0	0	0	0	0	0	0	0
FLAVIDUS	10	1.00	0	0	0	0	0	0	0	0	0
GOODEI	12	0	1.00	0	0	0	0	0	0	0	0
HELVOMACULATUS	10	0	.95	.05	0	0	0	0	0	0	0
HOPKINSI	3	1.00	0	0	0	0	0	0	0	0	0
JORDANI	10	1.00	0	0	0	0	0	0	0	0	0
LEVIS	1	1.00	0	0	0	0	0	0	0	0	0
MALIGER	5	1.00	0	0	0	0	0	0	0	0	0
MELANOPS	6	1.00	0	0	0	0	0	0	0	0	0
MELANOSTOMUS	12	1.00	0	0	0	0	0	0	0	0	0
MYSTINUS	12	1.00	0	0	0	0	0	0	0	0	0
NEBULOSUS	2	1.00	0	0	0	0	0	0	0	0	0
NIGROCINCTUS		NO DATA									
OVALIS	1	1.00	0	0	0	0	0	0	0	0	0
PAUCISPINIS	12	1.00	0	0	0	0	0	0	0	0	0
PINNIGER	12	1.00	0	0	0	0	0	0	0	0	0
POLYSPINIS	30	1.00	0	0	0	0	0	0	0	0	0
PRORIGER	11	1.00	0	0	0	0	0	0	0	0	0
REEDI	26	1.00	0	0	0	0	0	0	0	0	0
REEDI UNKNOWN	4	0	.75	.25	0	0	0	0	0	0	0
ROSACEUS	3	0	1.00	0	0	0	0	0	0	0	0
RUBERRIMUS	7	1.00	0	0	0	0	0	0	0	0	0
RUFUS	5	1.00	0	0	0	0	0	0	0	0	0
SAXICOLA	14	1.00	0	0	0	0	0	0	0	0	0
SEMICINCTUS	3	1.00	0	0	0	0	0	0	0	0	0
SERRANOIDES	8	1.00	0	0	0	0	0	0	0	0	0
VARIEGATUS	5	0	1.00	0	0	0	0	0	0	0	0
WILSONI	9	1.00	0	0	0	0	0	0	0	0	0
ZACENTRUS	16	0	1.00	0	0	0	0	0	0	0	0
SEBASTOLOBUS	12	0	1.00	0	0	0	0	0	0	0	0

TABLE 27. ALLELE FREQUENCY ESTIMATES AT THE GAM1 LOCUS FOR SEBASTES

SPECIES	N	A	B	C	D	E	F	G	H	I	J
ALUTUS	999	1.00	0	0	0	0	0	0	0	0	0
ALEUTIANUS	6	1.00	0	0	0	0	0	0	0	0	0
ALEUTIANUS UNK.	19	01.00	0	0	0	0	0	0	0	0	0
AURICULATUS	10	1.00	0	0	0	0	0	0	0	0	0
AURORA	5	1.00	0	0	0	0	0	0	0	0	0
BABCOCKI	10	1.00	0	0	0	0	0	0	0	0	0
BOREALIS	12	1.00	0	0	0	0	0	0	0	0	0
BREVISPINIS	3	.67	0	.17	.17	0	0	0	0	0	0
CARNATUS	6	1.00	0	0	0	0	0	0	0	0	0
CAURINUS WASH.	9	1.00	0	0	0	0	0	0	0	0	0
CAURINUS CALIF.	19	1.00	0	0	0	0	0	0	0	0	0
CHLOROSTICTUS	3	1.00	0	0	0	0	0	0	0	0	0
CHRYSOMELAS	24	1.00	0	0	0	0	0	0	0	0	0
CILIATUS	15	1.00	0	0	0	0	0	0	0	0	0
CILIATUS UNK.	17	1.00	0	0	0	0	0	0	0	0	0
CONSTELLATUS	9	.67	0	.33	0	0	0	0	0	0	0
CRAMERI	6	1.00	0	0	0	0	0	0	0	0	0
DIPLOPROA	3	1.00	0	0	0	0	0	0	0	0	0
ELONGATUS	2	1.00	0	0	0	0	0	0	0	0	0
ENTOMELAS	4	1.00	0	0	0	0	0	0	0	0	0
EOS	1	1.00	0	0	0	0	0	0	0	0	0
FLAVIDUS	8	1.00	0	0	0	0	0	0	0	0	0
GOODEI		NO DATA									
HELVOMACULATUS	10	1.00	0	0	0	0	0	0	0	0	0
HOPKINSI	3	1.00	0	0	0	0	0	0	0	0	0
JORDANI		NO DATA									
LEVIS	1	1.00	0	0	0	0	0	0	0	0	0
MALIGER	4	1.00	0	0	0	0	0	0	0	0	0
MELANOPS	5	.90	0	.10	0	0	0	0	0	0	0
MELANOSTOMUS	3	1.00	0	0	0	0	0	0	0	0	0
MYSTINUS	7	1.00	0	0	0	0	0	0	0	0	0
NEBULOSUS	2	1.00	0	0	0	0	0	0	0	0	0
NIGROCINCTUS	1	1.00	0	0	0	0	0	0	0	0	0
OVALIS	1	1.00	0	0	0	0	0	0	0	0	0
PAUCISPINIS	3	1.00	0	0	0	0	0	0	0	0	0
PINNIGER	3	1.00	0	0	0	0	0	0	0	0	0
POLYSPINIS	30	1.00	0	0	0	0	0	0	0	0	0
PRORIGER	3	1.00	0	0	0	0	0	0	0	0	0
REEDI	3	1.00	0	0	0	0	0	0	0	0	0
REEDI UNKNOWN	3	1.00	0	0	0	0	0	0	0	0	0
ROSACEUS	3	1.00	0	0	0	0	0	0	0	0	0
RUBERRIMUS	3	1.00	0	0	0	0	0	0	0	0	0
RUFUS	3	1.00	0	0	0	0	0	0	0	0	0
SAXICOLA	6	1.00	0	0	0	0	0	0	0	0	0
SEMICINCTUS		NO DATA									
SERRANOIDES	14	1.00	0	0	0	0	0	0	0	0	0
VARIEGATUS	3	1.00	0	0	0	0	0	0	0	0	0
WILSONI	2	1.00	0	0	0	0	0	0	0	0	0
ZACENTRUS	3	1.00	0	0	0	0	0	0	0	0	0
SEBASTOLOBUS	3	.33	.67	0	0	0	0	0	0	0	0

TABLE 28. ALLELE FREQUENCY ESTIMATES AT THE ACP LOCUS FOR SEBASTES

SPECIES	N	A	B	C	D	E	F	G	H	I	J
ALUTUS	999	1.00	0	0	0	0	0	0	0	0	0
ALEUTIANUS	6	.17	0	0	.83	0	0	0	0	0	0
ALEUTIANUS UNK.	19	0	0	0	0	01.00		0	0	0	0
AURICULATUS		NO DATA									
AURORA		NO DATA									
BABCOCKI	3	01.00		0	0	0	0	0	0	0	0
BOREALIS	12	0	0	0	0	01.00		0	0	0	0
BREVISPINIS		NO DATA									
CARNATUS	29	.07	.93	0	0	0	0	0	0	0	0
CAURINUS WASH.	3	01.00		0	0	0	0	0	0	0	0
CAURINUS CALIF.		NO DATA									
CHLOROSTICTUS	3	1.00	0	0	0	0	0	0	0	0	0
CHRYSOMELAS	23	.04	.96	0	0	0	0	0	0	0	0
CILIATUS	3	0	0	0	0	0	0	01.00		0	0
CILIATUS UNK.		NO DATA									
CONSTELLATUS	6	.67	.33	0	0	0	0	0	0	0	0
CRAMERI	3	0	0	.17	0	0	.83	0	0	0	0
DIPLOPROA	7	0	0	0	01.00		0	0	0	0	0
ELONGATUS		NO DATA									
ENTOMELAS	5	01.00		0	0	0	0	0	0	0	0
EOS	1	1.00	0	0	0	0	0	0	0	0	0
FLAVIDUS	3	01.00		0	0	0	0	0	0	0	0
GOODEI		NO DATA									
HELVOMACULATUS	6	1.00	0	0	0	0	0	0	0	0	0
HOPKINSI		NO DATA									
JORDANI	10	1.00	0	0	0	0	0	0	0	0	0
LEVIS	1	1.00	0	0	0	0	0	0	0	0	0
MALIGER	3	0	0	0	0	0	0	0	01.00		0
MELANOPS	3	01.00		0	0	0	0	0	0	0	0
MELANOSTOMUS	3	0	0	0	0	0	0	0	01.00		0
MYSTINUS	3	01.00		0	0	0	0	0	0	0	0
NEBULOSUS		NO DATA									
NIGROCINCTUS		NO DATA									
OVALIS	1	01.00		0	0	0	0	0	0	0	0
PAUCISPINIS		NO DATA									
PINNIGER		NO DATA									
POLYSPINIS	30	0	0	01.00		0	0	0	0	0	0
PRORIGER	4	01.00		0	0	0	0	0	0	0	0
REEDI	3	0	0	.83	.17	0	0	0	0	0	0
REEDI UNKNOWN	3	0	0	0	0	01.00		0	0	0	0
ROSACEUS		NO DATA									
RUBERRIMUS	3	0	0	0	0	01.00		0	0	0	0
RUFUS	4	0	0	0	0	0	0	0	01.00		0
SAXICOLA	6	0	0	01.00		0	0	0	0	0	0
SEMICINCTUS	3	0	0	01.00		0	0	0	0	0	0
SERRANOIDES	2	0	0	0	0	0	0	0	01.00		0
VARIEGATUS		NO DATA									
WILSONI	9	01.00		0	0	0	0	0	0	0	0
ZACENTRUS	3	0	0	0	01.00		0	0	0	0	0
SEBASTOLOBUS		NO DATA									