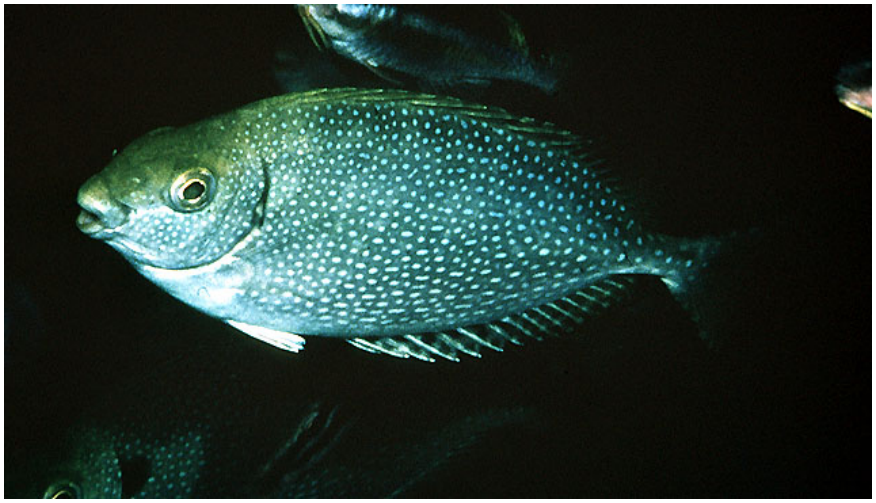
Siganus fuscescens

Rabbit fish, Mottled spinefoot



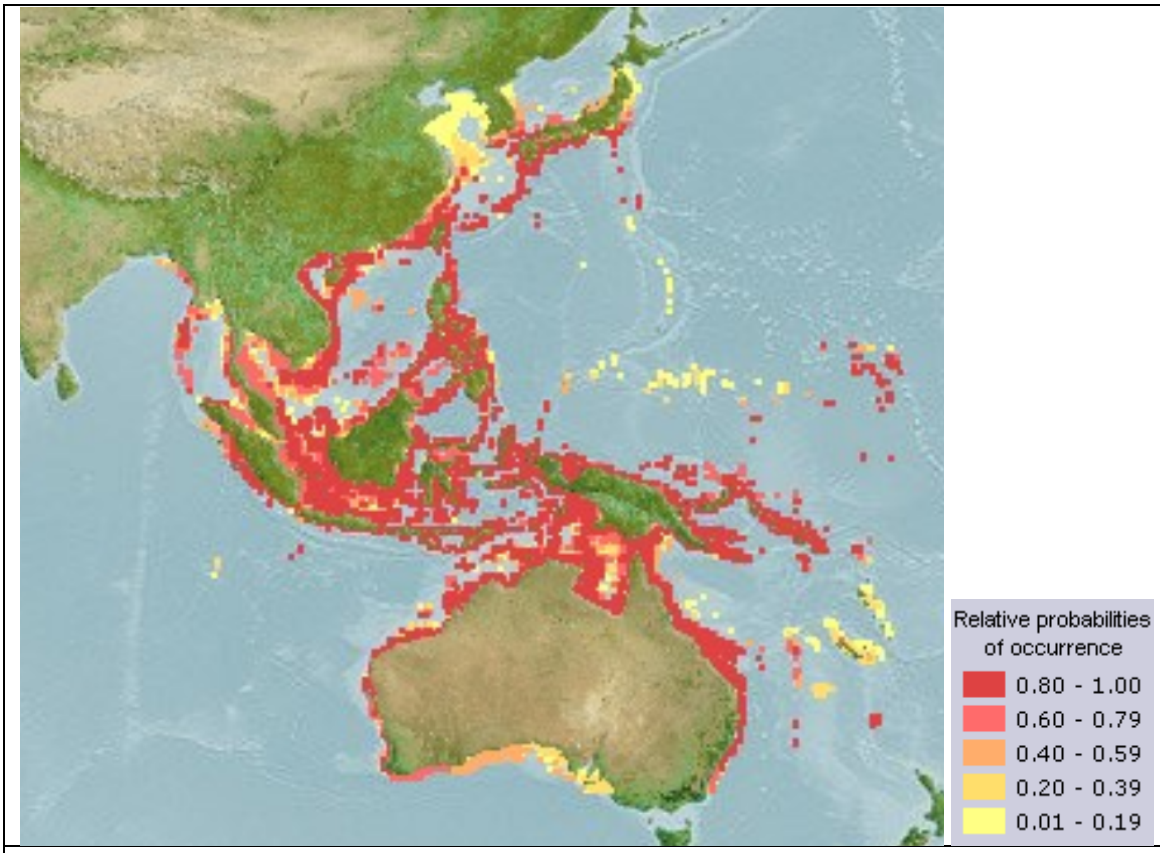
Taxonomy	
Kingdom	Animalia
Subkingdom	Bilateria
Infrakingdom	Deuterostomia
Phylum	Chordata
Subphylum	Vertebrata
Infraphylum	Gnathostomata
Megaclass	Osteichthyes
Superclass	Actinopterygii
Class	Actinopteri
Subclass	Neopterygii
Infraclass	Teleostei
Megacohort	Osteoglossocephalai
Supercohort	Clupeocephala
Cohort	Euteleosteomorpha
Subcohort	Neoteleostei
Infracohort	Eurypterygia
Section	Ctenosquamata
Subsection	Acanthomorphata
Division	Acanthopterygii
Subdivision	Percomorphaceae
Series	Eupercaria
Order	Perciformes
Suborder	Acanthuroidei

Family	Siganidae
Genus	*Siganus*
Species	*Siganus fuscescens*

A. Environment/Ecology:

Marine; brackish; reef-associated; oceanodromous (Ref. 51243); depth range 1 - 50 m (Ref. 9813). Tropical; 42°N - 37°S, 90°E - 171°E

B. Distribution:



Western Pacific: southern Korea, southern Japan, Ogasawara Islands, Taiwan, southern China, Malaysia, Singapore, Thailand, Andaman Islands, Indonesia, Philippines, Yap, Palau, Pohnpei (Caroline Islands), Solomon Islands, Papua New Guinea, Vanuatu, New Caledonia, and Australia. Often misidentified as *Siganus canaliculatus* (Ref. 2334).

C. Length at first maturity / Size / Weight / Age:

Maturity: L_m 5.6 range ? - ? cm Max length : 40.0 cm TL male/unsexed; (Ref. 9813); common length : 25.0 cm TL male/unsexed; (Ref. 9813)

D. Short description

Dorsal spines (total): 13; Dorsal soft rays (total): 10; Anal spines: 7; Anal soft rays: 9; Vertebrae: 13. Body olive green or brown above, silvery below; fish frequently with a dark patch below origin of lateral line. Adults become mottled when frightened. Slender, pungent, venomous spines.

Preopercular angle 89°-95°. Lower half to 2/3 of cheeks commonly covered with weak, scattered scales. Midline of thorax between pelvic ridges. Differs from *S. argenteus* in details of coloration and less deeply forked tail (Ref. 37816).

E. Biology

Inhabits algal and seagrass flats and shallow lagoon and coastal reefs (Ref. 9710, 11230). Forms schools. Mainly diurnal. Juveniles feed on filamentous algae, adults feed on leafy algae and seagrasses (Ref. 9710). Commercially cultured in Japan. Commonly found in large estuaries (Ref. 9002). Anterolateral glandular groove with venom gland (Ref. 57406).

F. Life cycle and mating behavior

In Belau, ripe individuals form pre-spawning congregations of 30-60 individuals in shoal areas of inner reef flats; spawning occurs on the 4th or 5th day of the new moon; spawning sites are near reef edge. About 300,000 eggs/female at a single spawning. Individuals that spawn in consecutive yrs. & that 2+ yr. class fish could spawn more than once in a single season. Aug (Ref 1754) in Belau.

G. Fisheries

In Bolinao, Philippines

H. IUCN Red List Status

GEOGRAPHIC RANGE

- Taxonomy

Kingdom:	Animalia
Phylum:	Chordata
Class:	Actinopterygii
Order:	Perciformes
Family:	Siganidae
Genus:	*Siganus*

- **Geographic Range**

NUMBER OF LOCATIONS

UPPER DEPTH LIMIT : 1 metres

LOWER DEPTH LIMIT : 50 metres

- **Population**

DESCRIPTION

Genetic structuring of populations was detected in the Philippines based on mitochondrial DNA (Magsino and Meñez 2008), suggesting that populations may need to be managed as separate stocks. In the Philippines, this species is very heavily exploited but still one of the

most common and abundant siganids in markets (K. Carpenter pers. comm. 2015).

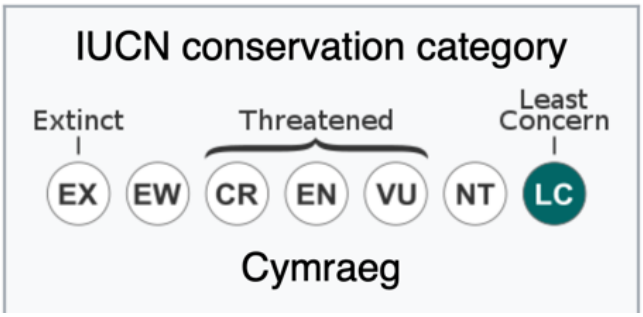
Densities of this species is low to moderate in Raja Ampat and Solomon Islands based on underwater visual surveys (A. Green unpublished data). Surveys around the remote islands of the Solomons showed a mean density of 1.2/ha and data from Raja Ampat showed a mean density of 2.1/ha (A. Green, unpublished data).

- **Habitat and Ecology**

This species is typically found in shallow coastal waters in algal, seagrass and reef habitats to depths of 50 m and appears to prefer clear water (Lieske and Myers 1994, Yamada et al. 1995). As juveniles, this species is locally very abundant, forming schools averaging 200 individuals, but up to 5,000. Adults feed on brown and green algae, while juveniles prefer filamentous algae and seagrasses (Woodland 2001). The maximum recorded length for this species is 40 cm TL (Woodland 1997).

- **THREATS**

This species is heavily exploited in parts of its range but this does not currently appear to be a major threat.



- **Use and Trade**

This species is caught with small seine nets, set nets, traps, and by spearing. Adults are marketed fresh, but juveniles are often dried and sold in very large numbers (Woodland 2001).

- **Conservation Actions**

There are no known species-specific conservation measures in place; however, it may occur in marine protected areas throughout its range..

I. More Information:

1) Stocks

(NA)

2) Ecology

Ecology of *Siganus fuscescens*

Main Ref.	Woodland, D.J., 1990
Distribution	Brackishwater • **estuaries/lagoons/brackish seas** Highighted items on the list are where *Siganus fuscescens* may be found.
Remarks	Feeds almost continually during daylight and settles at night to sleep. At Heron Is., the young adults at the water's edge under the lip of the beachrock pavement; older adults against the bases of coral clumps on outer reef flat. A sleeping fish adopt a camouflage pattern (Ref. 1419). Aggregates in March, April and May to spawn (Ref. 1363). Also Ref. 58534.

Substrate

Special habitats	**Beds:** sea grass; **Coral Reefs**;
Special habitats Ref.	Broad, G., 2003

Feeding

Feeding type	mainly plants/detritus (troph. 2-2.19)
Feeding type ref	Woodland, D.J., 1990
Feeding habit	grazing on aquatic plants

Trophic level(s)

	Original sample		Unfished population		Remark
Estimation method	Troph	s.e.	Troph	s.e.	
From diet composition	2.03	0.06			Troph of adults and juv./adults from 1 study.
Ref.					
From individual food items	2.28	0.13			Trophic level estimated from a number of food items using a randomized resampling routine.

3) Diet

Food and Feeding Habits: Diet Composition *Siganus fuscescens*

n = 1

Main Food	Percent	Trophic Level (y)	Predator Life Stage	Country	Locality	Ref.
plants	98	2.0	juv./adults	Kenya	Gazi Bay	111352

4) Reproduction

Reproduction of *Siganus fuscescens*

Main Ref.	Woodland, D.J., 1990
Mode	dioecism
Fertilization	external
Spawning aggregation	Yes. **Ref.** SCRFA, Science and Conservation of Fish Aggregations, 2018
Batch spawner	Yes. **Ref.** Bryan, P.G., B.B. Madrisan and J.P. McVey, 1975
Reproductive guild	nonguarders open water/substratum egg scatterers
Parental Care	none
Description of life cycle and mating behavior	In Belau, ripe individuals form prespawning congregations of 30-60 individuals in shoal areas of inner reef flats; spawning occurs on the 4th or 5th day of the new moon; spawning sites are near reef edge. About 300,000 eggs/female at a single spawning. Individuals that spawn in consecutive yrs. & that 2+ yr. class fish could spawn more than once in a single season. Aug (Ref 1754) in Belau.
Search for more references on reproduction	Scirus

5) Maturity

Maturity studies for *Siganus fuscescens*

n = 2

Sort by (•) Lm ( ) Country ( ) Locality ( ) tm

Lm (cm)	Length (cm)	Age range (y)	tm (y)	Sex of fish	Country	Locality
5.0 TL	-	-		male	Philippines	Bolinao, Pangasinan
5.6 TL	-	-		female	Philippines	Bolinao, Pangasinan

6) Spawning

Spawning for *Siganus fuscescens*

n = 2

J	F	M	A	M	J	J	A	S	O	N	D	Country	Locality
		111	111	111								Japan	Japan
111	111	111						111	111	111	111	Philippines	Pujada Bay, southeastern Mindanao (Aug 2002 - Jul 2003)

7) Spawning aggregation

Spawning Aggregations of *Siganus fuscescens*

Country	Spawning type	Aggregation type	Status
Palau	Pair spawning	Transient	Decreasing

8) Fecundity

Fecundity for *Siganus fuscescens*

Sort by Country Locality

[n = 2]

Country	Locality	Absolute Fecundity	
		min	max
Micronesia	Belau	300,000	0
Philippines	Macambol, Pujada Bay, southeastern Mindanao (Aug 2002 - Jul 2003)	286,384	618,603

9) Eggs

Egg Characteristics of *Siganus fuscescens*

Main Ref.	Woodland, D.J., 1990
Place of Development	on the bottom (demersal)
Attributes	sticky
Additional Characters	Under culture conditions, hatching occurs 24-26 hr after spawning at 29°-32°C, 31-34 ppt salinity.
Get Information on	Scirus

10) Egg development

(NA)

11) Age/Size

List of Population Characteristics records for *Siganus fuscescens*

n = 2

Sex	Wmax	Lmax (cm)	Tmax (y)	Country	Locality
unsexed		22.5		Philippines	Palawan / 1998-2004
unsexed		40			not specified

12) Growth

Growth parameters for *Siganus fuscescens*

Maximum Length 40cm TL

n = 1

Note that studies where Loo is very different (+/- 1/3) from Lmax are doubtful.

ø = 2.73 **L inf** = 25.0 cm TL **K** = 0.9 Median record no. 1 1363Ref. 1363

Loo (cm)	Length Type	K (1/y)	Temp° C	Ø'	Country	Locality	Questionable	Captive
25.0	TL	0.850	28.0	2.73	Philippines	Bolinao, Pangasinan	No	No

13) Length-weight

Length-Weight Parameters for *Siganus fuscescens*

Length-weight (log *a* vs *b*) graph [n=4] Hide graph

Sort by a b Country Locality

Score	a	b	Sex	Length (cm)	Length type	r^2	n	Country	Locality
0.91	0.03700	2.510	unsexed	6.7 - 22.5	TL	0.907	192	Philippines	Palawan / 1998-2004
0.97	0.02660	3.009	mixed		SL	0.973		Philippines	Pujada Bay, southeastern Mindanao (Aug 2002 - Jul 2003)
0.98	0.01620	3.010	unsexed	3.0 - 29.5	TL	0.980	468	New Caledonia	
0.99	0.01373	3.068	mixed	3.0 - 29.5	FL	0.992	481	New Caledonia	

14) Length-length

Length-length Parameters for *Siganus fuscescens*

[n=3]

Unknown length	a	b	Known length	Sex of fish
FL	0.000	0.940	TL	unsexed
SL	0.000	0.895	FL	unsexed
SL	0.000	0.841	TL	unsexed

15)

16) Length-frequencies

List of frequency studies for *Siganus fuscescens*

Locality	Year from - to	Sex	Gear	Frequency type
Bolinao reef, Pangasinan, Philippines	1987 - 1988	unsexed/mixed	gillnets	% of sample

17) Morphometrics

Morphometric Data for *Siganus fuscescens*

n = 3

Picture Name	Length		Lifestage	Aspect ratio
Sifus_u0.gif		none	unsexed	1.95
Sifus_u2.jpg	20.8	FL	unsexed	2.65
Sifus_u4.jpg		none	unsexed	2.07

Picture Used	Sifus_u0.gif
Sex	unsexed
Total length (TL)	547 pixels
Standard length	83.9 % TL
Fork length	94.1 % TL
Pre-anal length	40.4 % TL
Pre-dorsal length	18.1 % TL
Pre-pelvic length	22.5 % TL
Pre-pectoral length	17.7 % TL
Body depth	32.4 % TL
Head length (HL)	17.9 % TL
Eye diameter	31.6 % HL
Pre-orbital length	38.8 % HL

Aspect ratio of caudal fin	1.94772
Picture Used	Sifus_u2.jpg
Size (cm)	20.8 FL
Sex	unsexed
Locality	
Total length (TL)	565 pixels
Standard length	84.1 % TL
Fork length	94.0 % TL
Pre-anal length	41.1 % TL
Pre-dorsal length	18.8 % TL
Pre-pelvic length	24.4 % TL
Pre-pectoral length	16.3 % TL
Body depth	32.9 % TL
Head length (HL)	17.7 % TL
Eye diameter	33.0 % HL
Pre-orbital length	33.0 % HL
Aspect ratio of caudal fin	2.65042

Picture Used	Sifus_u4.jpg
Sex	unsexed
Total length (TL)	552 pixels
Standard length	83.0 % TL
Fork length	95.5 % TL
Pre-anal length	40.6 % TL
Pre-dorsal length	19.7 % TL
Pre-pelvic length	23.0 % TL
Pre-pectoral length	19.7 % TL
Body depth	31.9 % TL
Head length (HL)	19.7 % TL
Eye diameter	42.2 % HL
Pre-orbital length	28.4 % HL
Aspect ratio of caudal fin	2.07135
Remarks	1

18) Morphology

Morphology Data of *Siganus fuscescens*

Identification keys

Abnormalities

Main Ref.	Woodland, D.J., 1990
Appearance refers to	Male; Female

Descriptive characteristics of juvenile and adult

Striking features	none
Body shape lateral	fusiform / normal
Cross section	compressed
Dorsal head profile	more or less straight
Type of eyes	more or less normal
Type of mouth/snout	more or less normal
Position of mouth	terminal
Type of scales	cycloid scales
Diagnosis	Body olive green or brown above, silvery below; fish frequently with a dark patch below origin of lateral line. Adults become mottled when frightened. Slender, pungent, venomous spines. Preopercular angle 89°-95°. Lower half to 2/3 of cheeks commonly covered with weak, scattered scales. Midline of thorax between pelvic ridges. Differs from *S. argenteus* in details of coloration and less deeply forked tail (Ref. 37816).
Ease of Identification	likely to be confused with closely related species.

Meristic characteristics of Siganus fuscescens

Lateral Lines	1 Interrupted: No
Scale rows above lateral line	16 - 21
Barbels	0
on lower limb	20 - 25
on upper limb	5 - 7
total	25 - 32
Vertebrae	
preanal	10 - 10
total	13 - 13

Fins

Dorsal fin(s)

Attributes	extending over most of the back length
Fins number	1
Finlets No.	Dorsal 0 - 0
	Ventral 0 - 0

Spines total	13 - 13
Soft-rays total	10 - 10
Adipose fin	absent

Caudal fin

Attributes	forked; more or less normal

Anal fin(s)

Fins number	1
Spines total	7 - 7
Soft-rays total	9 - 9

Paired fins

Pectoral	Attributes more or less normal
	Spines 0
	Soft-rays 15 - 17
Pelvics	Attributes more or less normal
	Position thoracic behind origin of D1
	Spines 2
	Soft-rays 3 - 3

19) Larvae

Larvae Information Summary for *Siganus fuscescens*

Main Ref:	Woodland, D.J. 1990

Yolk-sac larvae

Place of development	planktonic
Larval area	Northwestern Pacific (Japan)

Newly hatched larvae averaged 2.1 mm in length; have a neutral buoyancy at 32.2 ppt salinity & swarm actively towards the surface; begin to feed 3 days after hatching (diet include phyto- & zoo- plankton). Metamorphosis to juvenile depend on nutritional status, occurs when larvae is 20-24 mm SL.

Post larvae

Striking feature	some dorsal fin rays very elongated
Striking shape lateral	normal (not striking)
Striking feature	some dorsal fin rays very elongated
Shape of gut	triangular
Peritoneum	with row of melanophores
Pectorals	normal
Pelvics	with elongated fin rays

20) Recruitment

(NA)

21) Abundance

Abundance List for *Siganus fuscescens*

n = 8

Country	Locality	Year	Qualitative Value	Ref.
Australia	Fog Bay	1988 - 1988	absent	78120
Australia	Gulf of Carpentaria (Eastern Deep)	1988 - 1988	rare	78120
Australia	In the Gulf of Carpentaria (Eastern Deep)	1988 - 1988	absent	78120
Australia	Melville Island and Joseph Bonaparte Gulf	1988 - 1989	absent	78120
Australia	off Goulbourn Is and Gulf of Carpentaria (Shallow)	1988 - 1988	absent	78120
Australia	off Melville Island (Western Deep)	1988 - 1988	absent	78120
Australia	Off the Goulburn Is and Gulf of Carpentaria	1988 - 1988	absent	78120
Australia	Shark Bay, Western Australia	2009 - 2009	very common	115274

References

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4. Lieske, E. and Myers, R. 1994. *Collins Pocket Guide. Coral reef fishes. Indo-Pacific & Caribbean including the Red Sea*. Haper Collins Publishers.
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8. Yamada, U., Shirai, S., Irie, T., Tokimura, M., Deng, S., Zheng, Y., Li, C., Kim, Y.U. and Kim, Y.S. 1995. *Names and illustrations of fishes from the East China Sea and the Yellow Sea*. Overseas Fishery Cooperation Foundation, Tokyo, Japan.