

Dorsal View (♀)

Ventral View (♀)

Ventral View (♂)

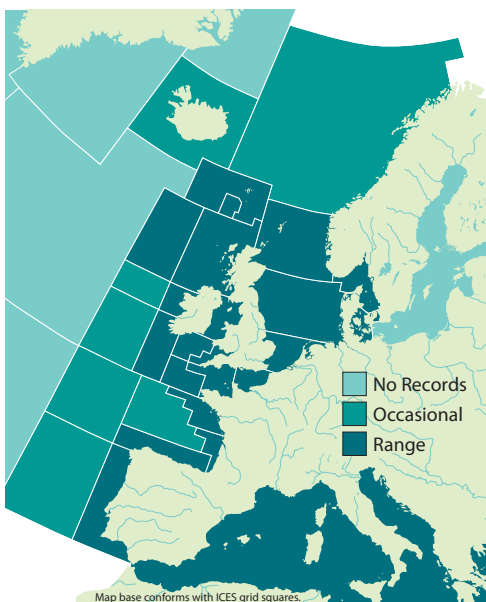
COMMON NAMES

Thornback Ray, Thornback Skate, Roker, Maiden Ray, Hardback, Stekelrog (Ne), Raie Bouclée (Fr), Nagelroche (De), Raya de Clavos (Es), Piggskate (No).

SYNONYMS

Raja rubus (Schneider, 1801), *Raja aspera* (Risso, 1810), *Raja pontica* (Pallas, 1811), *Dasybatis clavata* (Bonaparte, 1840), *Raja capensis* (Müller & Henle, 1841), *Raja rizacanthus* (Regan, 1906), *Betaraia clavata* (Leigh-Sharpe, 1924).

DISTRIBUTION



The Thornback Ray occurs throughout the northeast Atlantic from the Faroe Islands, Iceland and Norway as far south as Namibia. Found in the Mediterranean, Black and western Baltic Seas. It occurs off western Africa and has recently been reported from the southwest Indian Ocean (Fowler, S. L. *et al*; 2005).

APPEARANCE

- Long thorny tail with distinctive light/dark banding.
- Upper surface light brown to grey.
- Variable patterning including dark and yellow patches with dark spots.
- Lower surface creamy white with greyish margin.
- Scattered buckler thorns on upper surface.
- Row of 30–50 thorns along midline to first dorsal fin.

Thornback Ray males can grow to a maximum of 105cm total length while females can reach 130cm, although most are less than 85cm (Whitehead *et al.*, 1986; Lockley, 2009). The teeth of both species are arranged into 36–44 rows in the upper jaw, pointed in males, blunter in females and juveniles (Clark, 1926). Both sexes are reported to have a maximum longevity of 12 years (Fowler *et al.*, 2005).

The tail is long and solid with rows of thorns running longitudinally. The dorsal surface is covered in spines in both sexes while large females may have spiny ventral surfaces (Whitehead *et al.*, 1986). In sexually mature fish some of the spines are thickened with button-like bases, known as bucklers. These are particularly well developed on the tail and back of sexually mature females and may be present ventrally. There are 0–2 thorns between the dorsal fins (Whitehead *et al.*, 1986).

Colouration varies from light brown to grey with darker blotches and numerous yellow patches. The yellow patches are sometimes surrounded by small dark spots. The underside is creamy-white with a greyish margin (Whitehead *et al.*, 1986). When young they can be pale with large, dark eyespots on each wing. The Thornback Ray shows an incredibly large variation in colouring making identification of the species potentially challenging.

SIMILAR SPECIES

Amblyraja radiata, Starry Skate

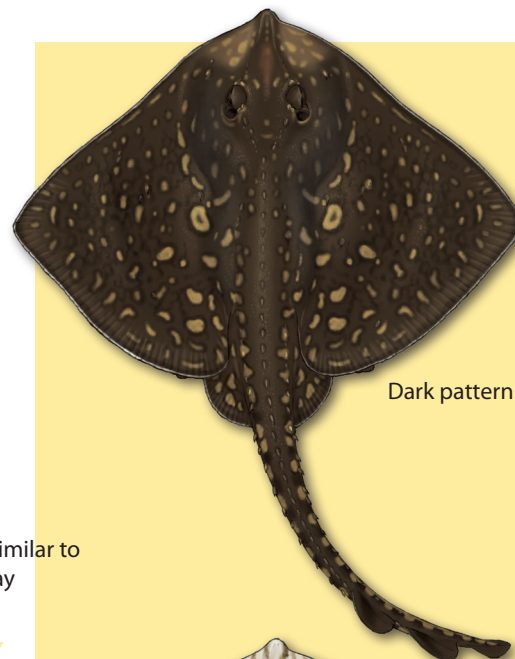
Leucoraja circularis, Sandy Ray (not illustrated)

Leucoraja fullonica, Shagreen Ray (juv.) (not illustrated)

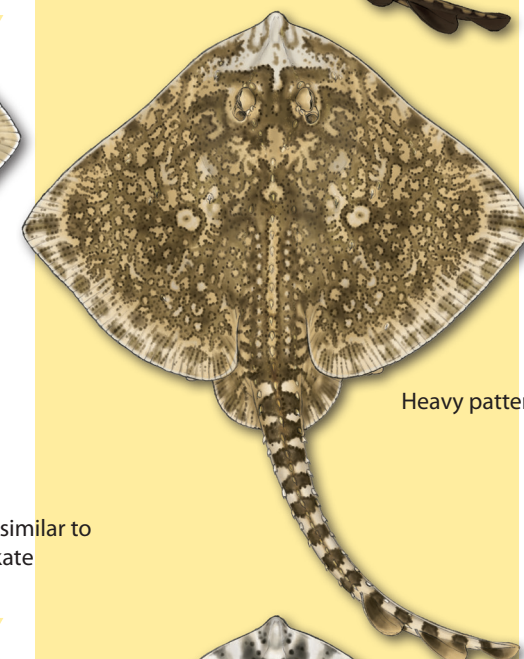
Raja brachyura, Blonde Ray

Skates and rays are very variable in their colouration and patterning, particularly the Thornback Ray. Around the UK it can be solid dark brown without the distinct marble patterning, although there tend to some (2–10) creamy white spots left on the pectoral fins close to the midline arranged in regular patterns. In other areas it is paler and can be misidentified as the Blonde Ray, *Raja brachyura*. The creamy white spots remain on these specimens but are much less distinct. What causes this morphological plasticity is not known.

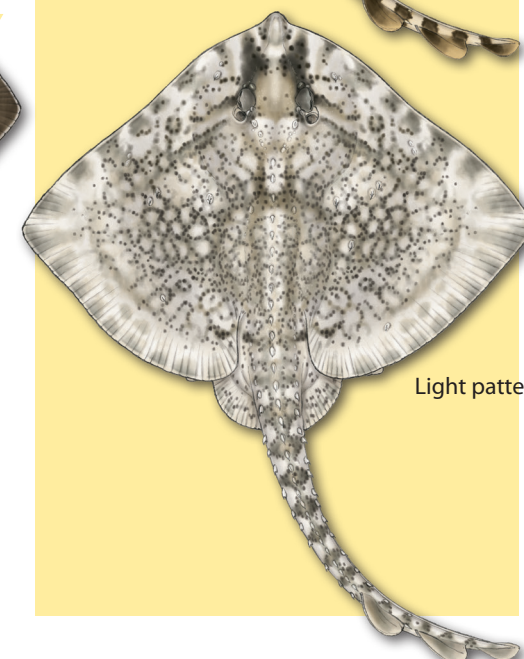
Studies from the Mediterranean have shown that the rajids are genetically very close (Turan, 2007). This means that interbreeding between the more common UK skates is a possibility and could lead to hybrid individuals with indistinct colouration and morphology.



Dark pattern

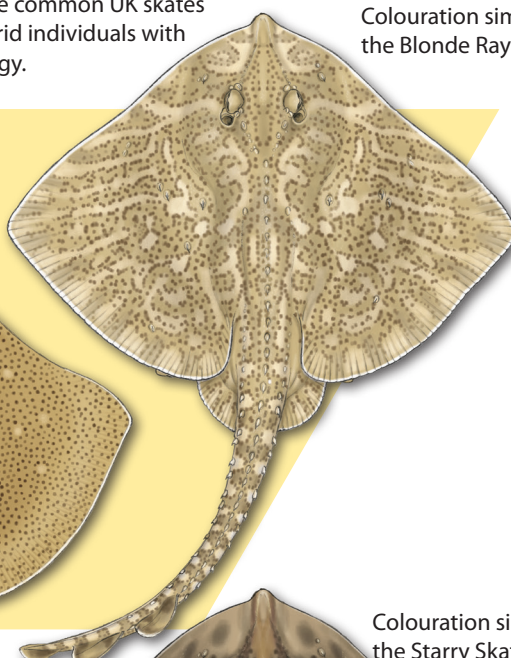
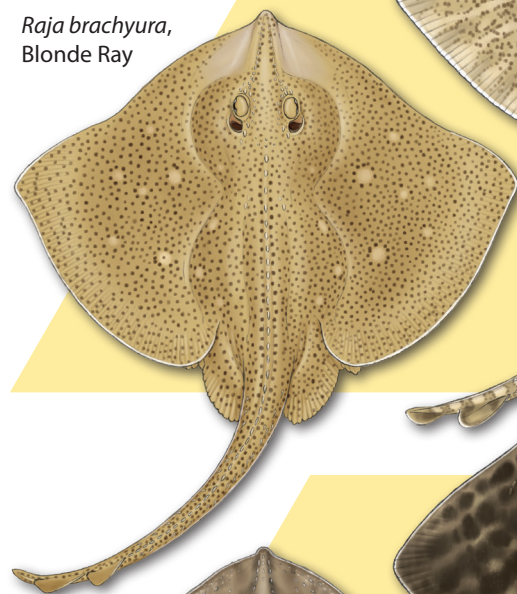


Heavy pattern

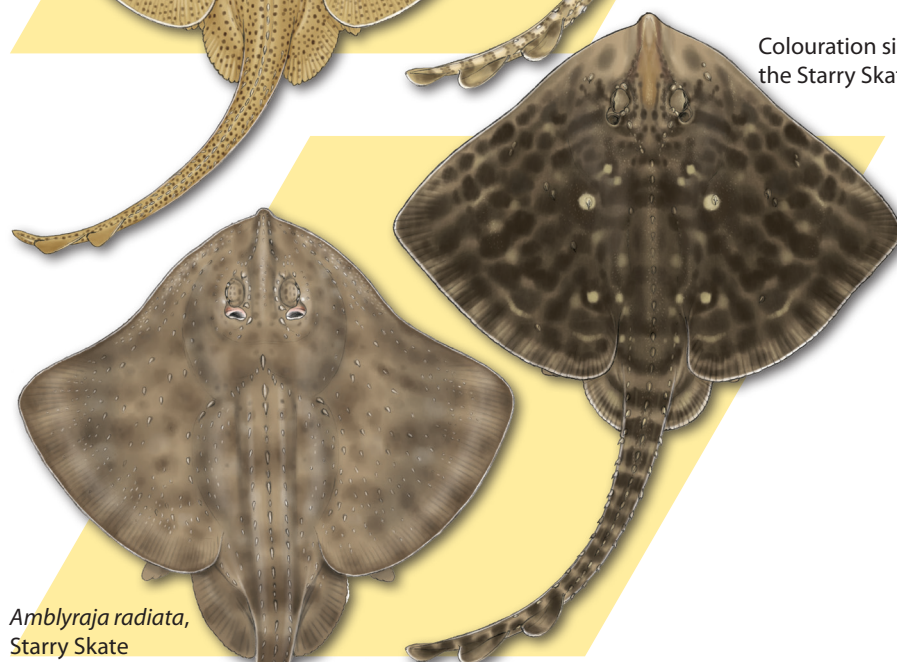


Light pattern

Raja brachyura,
Blonde Ray



Colouration similar to
the Blonde Ray



Colouration similar to
the Starry Skate

Amblyraja radiata,
Starry Skate

(Not to scale)

TEETH

- Less than 60 rows of unicuspid teeth, usually 36–44 in the upper jaw (Clark, 1926).
- Teeth in males are sharper than in females and juveniles (Ellis and Walker, 2000).



ECOLOGY & BIOLOGY

HABITAT

The Thornback Ray inhabits continental shelf and upper slope waters from 10–300m (32–985ft) through most of their range, with the notable exception of the eastern Ionian Sea where it occurs from 300–577m (985–1,890ft) (Whitehead *et al.*, 1986). Around European coastal waters, it is most abundant from 10–60m (32–195ft). Studies from the Thames Estuary have shown the Thornback Ray to be seasonally migratory, spending the winter in deeper water and coming into shallower areas in the late spring and summer to breed (Hunter *et al.*, 2005). Juveniles are more likely to be found in shallower, coastal waters than adults as these areas are used as nursery grounds.

Studies from the Bristol Channel have shown the Thornback Ray, along with the Small Spotted Catshark, *Scyliorhinus canicula*, to be one of the most important elasmobranch species to the local ecology. As with most demersal skate, it prefers soft substrates such as mud and sand but can also be found over gravel and rock beds. It is known to segregate by sex and size (Fishmap, Unknown).

DIET

Juvenile Thornback Rays feed predominantly on small crustaceans such as amphipods, mysids and crangonid shrimps. Adults feed on larger crustaceans and small teleost fish such as sandeels, small gadoids and dragonets (Fishmap, Unknown). Studies from the Black Sea have shown sprat, horse mackerel and anchovy are the most important prey items (Orlov, 1998).

REPRODUCTION

The Thornback Ray spends the winter in deeper water, migrating inshore to breed and lay eggs during the spring and summer (Hunter *et al.*, 2005). It is estimated to reach 50% maturity at a total length of around 77cm (8.8 years) for females and 68cm (7.1 years) for males in the North Sea (Fishmap, Unknown). However, Ryland and Ajayi (1984) reported that they first spawn earlier than this in their 5th year (Ryland and Ajayi, 1984). Other estimates from the northeast Atlantic have given size at maturity figures of 60–81cm total length for males and 60–101cm total length for females (Fishmap, Unknown).

REPRODUCTION CONTINUED

Spawning occurs in inshore waters between February and September (Fowler *et al.*, 2005), with a peak in May and June and a theoretical maximum of 140–160 eggs being laid a year. The actual number of eggs laid is likely to be closer to 48–74 (Fishmap, Unknown). Incubation generally lasts for 4–6 months depending on the water temperature and the young hatch measuring 11–13cm total length (Fishmap, Unknown).

EGGCASE

- 50–90mm in length (excluding horns).
- Almost as wide as long.
- Obvious keels and fields (Shark Trust, 2008).

Similar eggcase to the Blonde Ray, *Raja brachyura*.



COMMERCIAL IMPORTANCE

The Thornback Ray is one of the most commonly found rajids in European fish markets and constitutes an extremely important part of many commercial fisheries. It is targeted by gillnet and longline fisheries and is taken as bycatch in otter and beam trawls. It is also caught using set nets and is targeted by recreational anglers (Fishmap, Unknown).

THREATS, CONSERVATION, LEGISLATION

The Thornback Ray is a commercially important species targeted across much of its range and taken as bycatch in multispecies fisheries. Although little species-specific landing data is available, market sampling indicates that the Thornback Ray is one of the most frequently landed skates across Europe. Between 1982 and 1994 in France, Thornback Rays accounted for more than 30% of all skates and rays landed (Fishmap, Unknown). However, there has been some evidence of declining catch rates in northwest Europe and concern that the current intensity of fishing pressure is not sustainable. Due to its large size and thorns, the Thornback Ray rarely escapes from trawl nets. Coupled with the slow growth rates and low fecundity common to all skates, they could be extremely vulnerable to over fishing (Ellis and Walker, 2000).

All rajids are managed under a Total Allowable Catch (TAC) system in EU waters. Between 1999 and 2005 the 6,060t TAC was reduced by 47% and by a further ~50% from 2005 to 2008 (ICES, 2008). Originally the TAC applied only to areas IIa and IV, however in January 2009 the TAC was extended to include ICES divisions IIa, IIIa, IV, VIa-b, VIIa-k, VII and IX. The table below gives a summary of the TAC's for the years 2004 to 2009.

ICES Division	2004	2005	2006	2007	2009	2009	2009
IIa, IV	3,503	3,220	2,737	2,190	1,643	1,643	1,643
IIIa	N/A	N/A	N/A	N/A	N/A	68	68
VIa-b, VIIa-c, VIIe-k	N/A	N/A	N/A	N/A	N/A	15,748	15,748
VIIId	N/A	N/A	N/A	N/A	N/A	1,044	1,044
VIII, IX	N/A	N/A	N/A	N/A	N/A	6,423	6,423

(All figures in tons. European Union; 2009)

Since 2008 European countries have been required to record most skate and ray landings by species to give a clearer picture of the status of populations in EU waters (ICES, 2008). This may be difficult however due to the variability in colouration exhibited by the Thornback Ray (Ellis and Walker, 2000). Some Sea Fisheries Committees (SFC) around the UK have byelaws which stipulate a minimum disc width (DW) for landed skates and rays, measured from the extreme tips of the pectoral fins. The SFC's which implement these and the details are shown in the table below.

SFC	DW (cm)	Other
Cumbria	45	Cannot land wings less than 22cm in their maximum dimension
Kent & Essex	40	Cannot land wings less than 19cm in their maximum dimension
Southern	40	Cannot land wings less than 20cm in their maximum dimension
South Wales	45	Cannot land wings less than 22cm in their maximum dimension
States of Guernsey	36	

THREATS, CONSERVATION, LEGISLATION

(Cumbria SFC, Unknown, Kent & Essex SFC, Unknown; South Wales SFC, Unknown; Southern SFC, 2006; NFFO, 2004)

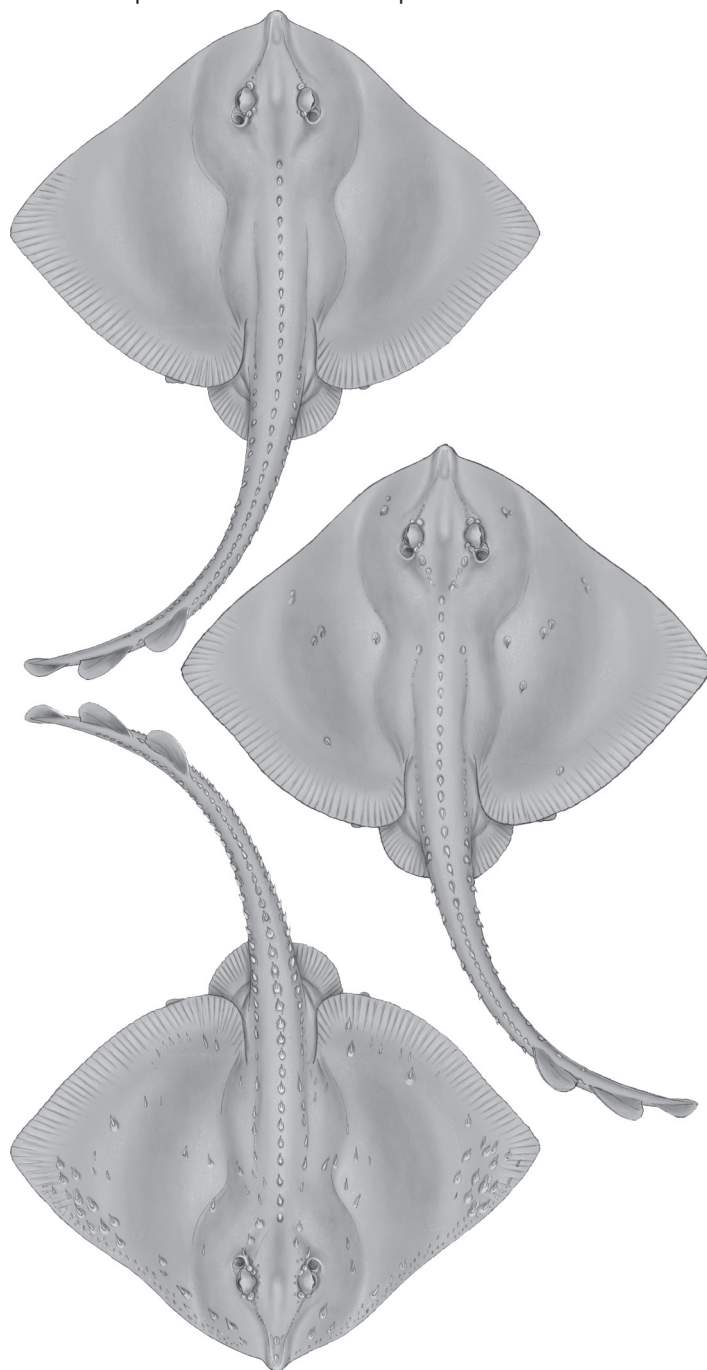
However, such localised management strategies are unlikely to be significant for the conservation of wider populations (Fowler *et al.*, 2005). There is currently no effective European management plan for the Thornback Ray.

IUCN RED LIST ASSESSMENT

Near Threatened (2000).

HANDLING AND THORN ARRANGEMENT

- Handle with care.
- Large, scattered buckler thorns on dorsal surface and occasionally ventral surface.
- Strong midline of thorns.
- Lateral pairs of thorns sometimes present on tail.



REFERENCES

- CLARK, R. S. 1926. Rays and Skates. A Revision of the European Species. Fishery Board for Scotland. HM Stationary Office. Edinburgh, UK.
- CUMBRIA SFC. 2008. Minimum Fish Sizes. www.cumbriasfc.org.uk.
- ELLIS, J., WALKER, P. 2000. *Raja clavata*. In: IUCN 2008. 2008 IUCN Red List of Threatened Species. www.iucnredlist.org.
- EUROPEAN UNION. 2009. Council Regulation (EC) No. 43/2009. *Official Journal of the European Union*, L22/1. www.mfa.gov.uk.
- FISHMAP. Unknown. Thornback Ray. *Raja clavata*. ICES. Copenhagen, Denmark. www.ices.dk.
- FOWLER, S. L., CAVANAGH, R. D., CAMHI, M., BURGESS, G. H., CAILLIET, G. M., FORDHAM, S. V., SIMPFENDORFER, C. A., MUSICK, J. A. 2005. Sharks, Rays and Chimaeras: The Status of the Chondrichthyan Fishes. IUCN SSC Shark Specialist Group. IUCN Publications. Cambridge, UK.
- HUNTER, E., BUCKLEY, A. A., STEWART, C., METCALFE, J. D. 2005. Migratory Behaviour of the Thornback Ray, *Raja clavata*, in the Southern North Sea. *Journal of the Marine Biological Association of the United Kingdom*, 85: 1,095–1,105.
- ICES. 2008. Demersal elasmobranchs in the North Sea (Sub-area IV), Skagerrak (Division IIIa), and eastern English Channel (Division VIII). ICES advice 2008, Book 6.
- KENT & ESSEX SFC. 2008. Minimum Fish Sizes. www.kentandessex-sfc.co.uk.
- Lockley, P. 2009. Monster Ray Captured. *Fishing News*, 12/06/2009.
- NFFO. 2004. Official Yearbook and Diary. Grimsby, UK.
- ORLOV, A. M. 1998. The Diets and Feeding Habits of Some Deep-Water Benthic Skates (Rajidae) in the Pacific Waters off the Northern Kuril Islands and Southeastern Kamchatka. *Alaska Fishery Research Bulletin*, 5 (1): 1–17.
- RYLAND, J. S., AJAYI, T. O. 1984. Growth and population dynamics of three *Raja* species (Batoidei) in Carmarthen Bay, British Isles. *J. Const. int. Explor. Mer*, 41: 111–120.
- SOUTH WALES SFC. 2008. Skate and Ray – Minimum Size. www.swsfc.org.uk.
- SOUTHERN SFC. 2008. Minimum Landing Size. www.southernsfc.org.uk.
- TURAN, C. 2007. Molecular Systematic Analyses of Mediterranean Skates (Rajiformes). Fisheries Genetics Laboratory, Faculty of Fisheries, Mustafa Kemal University, Iskenderun, Hatay, Turkey.
- WHITEHEAD, P. J. P., BAUCHOT, M. L., HUREAU, J. C., NIELSEN, J., TORTONESE, E. (Eds.). 1986. Fishes of the Northeast Atlantic and Mediterranean. UNESCO. Paris, France.

Text: Richard Hurst.

Illustrations: Marc Dando.

Citation

Shark Trust; 2009. An Illustrated Compendium of Sharks, Skates, Rays and Chimaera. Chapter 1: The British Isles. Part 1: Skates and Rays.

Any amendments or corrections, please contact:

The Shark Trust

4 Creykes Court, The Millfields

Plymouth, Devon PL1 3JB

Tel: 01752 672008/672020

Email: enquiries@sharktrust.org

For more ID materials visit www.sharktrust.org/ID.

Registered Company No. 3396164.

Registered Charity No. 1064185