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Growth and longevity of the grey seal *Halichoerus grypus* in eastern Canada

by

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Abstract

Analyses of data on age, length and weight show that the Canadian grey seal grows more rapidly, lives longer and is larger and heavier than the British grey seal.

Résumé

L'analyse de données sur l'âge, la longueur et le poids démontre que le phoque gris du Canada croît plus rapidement, a une plus grande longevité et atteint une taille et un poids supérieur au phoque gris d'Angleterre.

Introduction

A recently published study on the grey seal in eastern Canada (Mansfield and Beck 1977) gives preliminary information on the relationship between age and weight in males and females (Fig. 12, *op. cit.*). Recent data obtained from a shot sample of grey seals collected at the Sable Island breeding colony confirm this picture of growth and provide an interesting comparison between Canadian and British grey seals.

Growth

Pups

Like most phocids, grey seal pups grow at a remarkably rapid rate, the whole period from birth to weaning being compressed into 2 to

3 weeks. During this time the pup feeds on the mother's highly concentrated milk which contains over 50 percent fat (Amoroso and Matthews 1952). Since the nursing mother fasts while the pup is feeding, her decrease in weight is even more dramatic than the pup's increase.

Growth rates were obtained by tagging and colour-marking a sample of 19 new-born pups on Sable Island and weighing them at intervals of 3 to 5 days. More frequent weighing was not carried out in order to keep disturbance of the breeding colony to a minimum and to prevent pups from being deserted. Observations were also made on the general appearance and behaviour of the pups, this information being used to define approximate age categories. These follow closely the age categories used by biologists in the United Kingdom (Boyd, Hewer and Lockie 1962) but differ by being arranged in 5-day, rather than 7-day, intervals.

Only 9 of the pups selected for weighing were followed through the suckling period, which lasts 14 or 15 days in contrast to the 16-21 day period for British grey seals (Bonner 1972). Of the remaining 10 pups, two were found dead at the second weighing and the remainder were not seen again.

Selected growth curves are shown in Fig. 1. The starveling pup 688, which slowly decreased in weight from 18 kg on 10 January to 12 kg on 24 January, remained active until it was killed on the last day. At this time it had begun to moult and showed extensive worn areas on chest and flippers. The maximum growth recorded was for pup 686, which increased in weight from 18 kg to 59 kg, an average daily increase of 2.9 kg. This represents a doubling in weight in 6 days and tripling in 12 days, a phenomenal rate of growth exceeded among phocids only by the elephant seal *Mirounga leonina* (Laws 1953). The average weight of the 8 growing pups increased from 17 kg to 46 kg, nearly tripling in the 14-day period. The average daily increase during this time was 2.1 kg. The figures show that Canadian grey seal pups are larger on average than British grey seal pups and reach their final size 4 or 5 days earlier.

A further series of weights was collected from pups killed a known number of days after birth. Sculps (complete skin and attached blubber) were removed from the carcasses and weighed separately. The results in Figs. 2 and 3 show clearly that the greater part of the increase in weight is derived from the deposition of fat in the blubber. The increase in weight during suckling is reflected in the increase in body measurements of these same pups; on average the nose-tail length increased by 22 percent (87 to 106 cm), but the girth showed a more marked increase of 55 percent (65 to 101 cm).

Since the mother fasts during lactation, her decrease in body weight is greater than the pup's gain from her milk. This has been well shown by Amoroso and Matthews (1952) who kept a grey seal mother and pup

in captivity and weighed them daily. Over the 18-day period, the pup gained 27 kg in weight while the mother lost 43 kg. Although we were not able to carry out a similar experiment at Sable Island, we obtained a series of weights of adult females whose pupping dates were known. The whole body weights (less blood), as well as the weights of sculps and carcasses, are shown in Fig. 4. The trend of weight loss is almost identical with that of the captive female of Amoroso and Matthews (*op. cit.*), about 60 percent resulting from loss of blubber fat and the rest from the loss of other tissues.

At weaning, male pups weigh on average about 3.6 kg more than female pups, this difference increasing as the animals grow older.

Immature seals

During the remainder of their first year, pups continue to grow in length (Fig. 5), but may not continue to increase in weight. Only three yearling seals were weighed, all of which were the size of moulted pups, but otherwise appeared perfectly healthy. They might have been pups that had been deserted before normal weaning, but observation of the non-breeding seals at Sable Island shows that most one-year-olds are of the same size.

After pups have moulted their *lanugo*, most do not moult again until the second year. By the time they are one year old, the hair has usually faded to a light brown colour and has worn off the belly and chest. The faded pelage, small size and small nose, hardly more pronounced than in the pup, help to distinguish the one-year-old seals from the older immature seals in the non-breeding groups.

During the second, third and fourth years, the difference in mean body length between the sexes is maintained (Fig. 6). In the male the nose begins to assume the elongated rounded contour of the adult, and in the female the pelage becomes much whiter on the throat and neck and the overlying dark spots more pronounced.

Adults

The majority of males and females become sexually mature when 4 years old. At this age the growth of females begins to slow down, almost ceasing at 10 years of age when a mean length of 200 cm has been attained (Fig. 6). In the male, growth in length continues for another year before beginning to slow down; it largely ceases at about 12 years of age when a mean length of 225 cm has been attained (Fig. 6). By comparison breeding grey seals taken from the Farne Islands in the United Kingdom are slightly smaller, females attaining a mean adult length of about 185 cm and males about 210 cm (Platt, Prime and Witthames 1975). As in all phocids there is a considerable degree of overlap in body length between each age group, which allows this measurement to be used only as an approximate indicator of age. There is no evidence of accelerated growth in the males, as found in the southern elephant seal (Laws 1953).

Fewer data are available for increase in weight with age. Measurements of females are most numerous and these show that growth begins to slow down at 5 years of age and ceases at about 12 years of age when a mean weight of 175 kg has been attained (Fig. 7). Since most weights were recorded during the breeding season, they vary widely according to the amount of milk already provided to the suckling pup. Weights of males indicate that growth is maintained until well after 20 years of age. The oldest males probably reach a weight of 400 kg, about 35 percent of which will be skin and blubber. This enormous reserve of fat is comparable with that of the female just prior to parturition and allows the adult male to fast for many weeks while undergoing the rigours of the breeding season. In weight, as in length, seals taken from the Farne Islands are slightly smaller, females attaining a mean adult body weight of about 165 kg and males about 260 kg (Platt et al. 1975).

Longevity

The grey seal, like many other phocids, is a comparatively long-lived mammal, the oldest known examples being a 41-year-old captive male from the Skansen Zoo (Mohr 1952) and a 46-year-old wild female from Shetland (Bonner 1971). However these ages appear to be exceptional since Hewer (1964) found that, out of a sample of 74 breeding animals, females lived to 35 years and males to 25 years. He attributed the shorter life of the males to the stress imposed by fasting and maintaining dominance during the breeding season.

Canadian grey seals appear to survive a little longer than British grey seals. From our sample of 1087 seals examined, 8 female seals were in their 30's and 3 in their 40's. The oldest female was 44 years old and still sexually active. The males were younger, only 7 being older than 25 years. The two oldest males were both 30 and also still sexually active.

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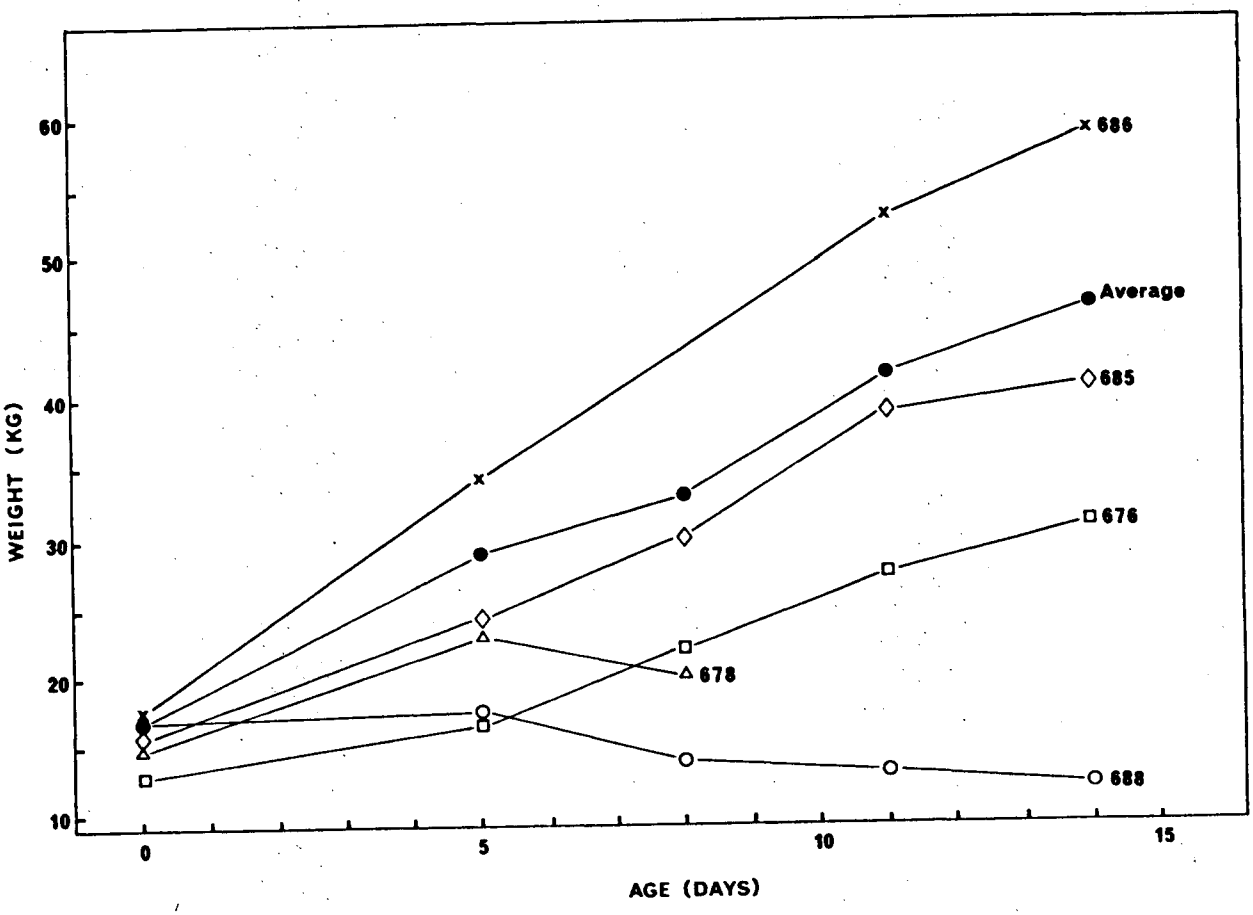

Fig. 1. Selected growth curves of grey seal pups from Sable Island. The curve of average growth represents the 8 pups which were available for weighing 14 days after birth (the starveling 688 is excluded).

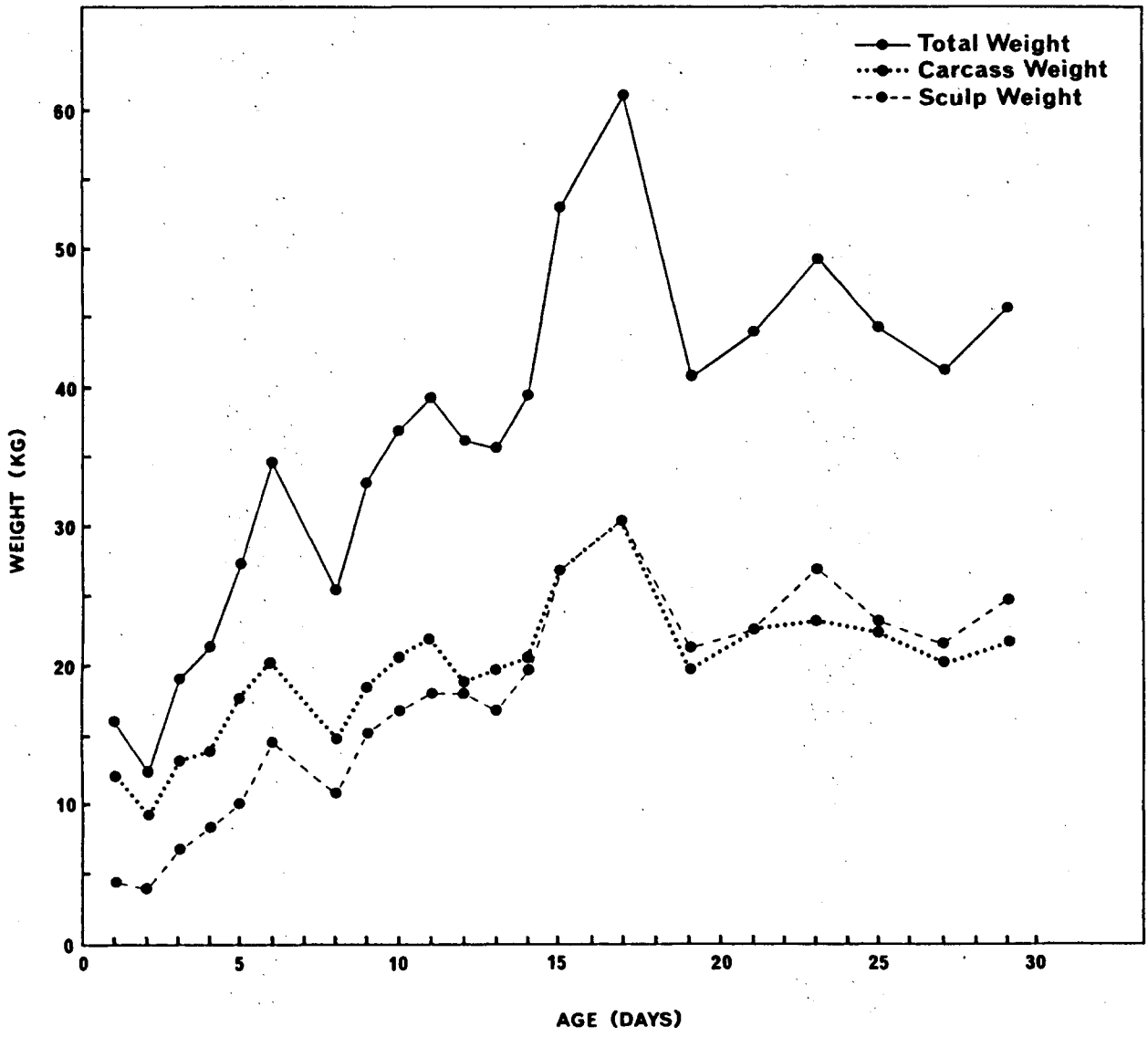

Fig. 2. Total weight, carcass weight and sculp weight of grey seal pups of known age.

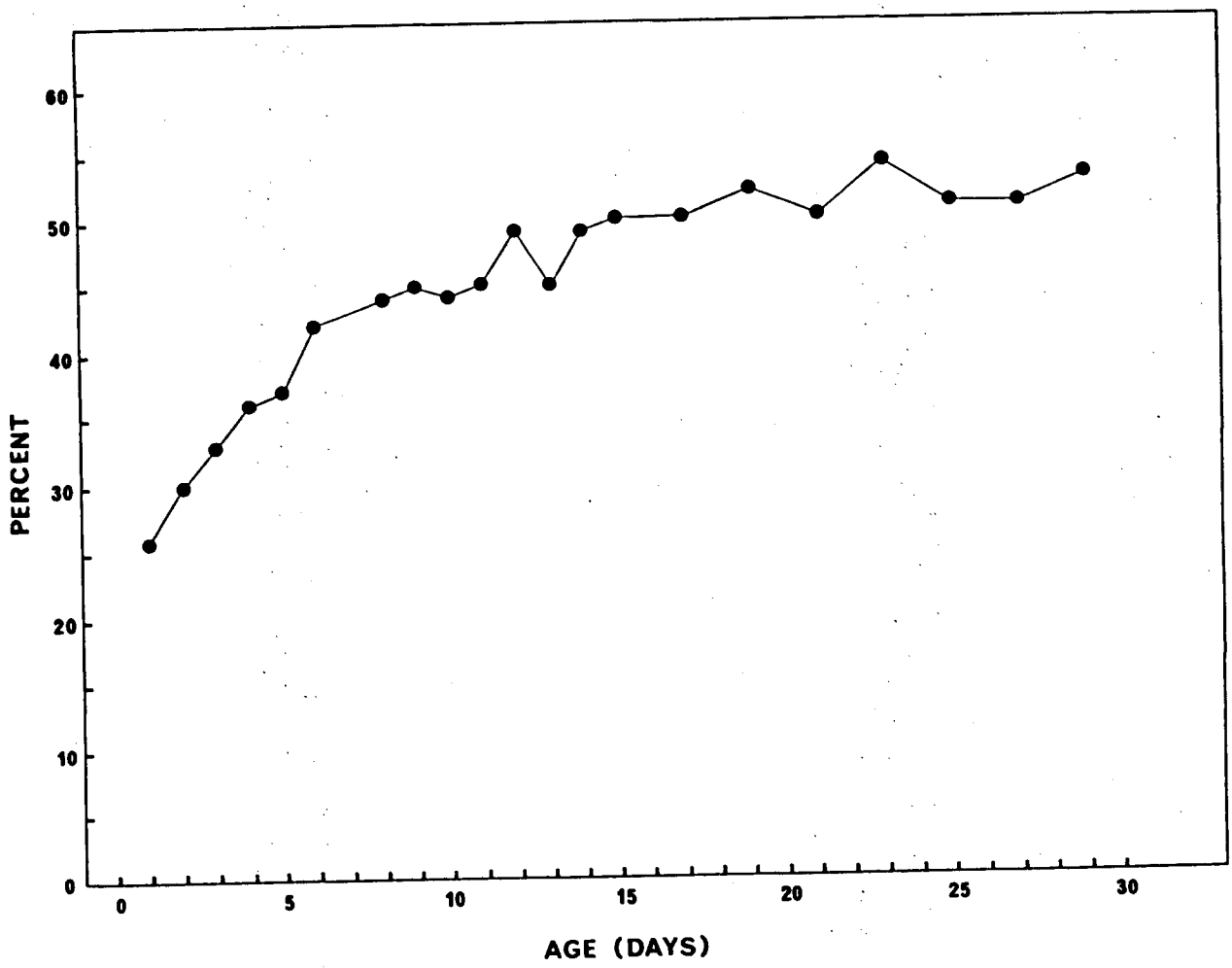

Fig. 3. Sculp weight as a percentage of total weight in grey seal pups of known age.

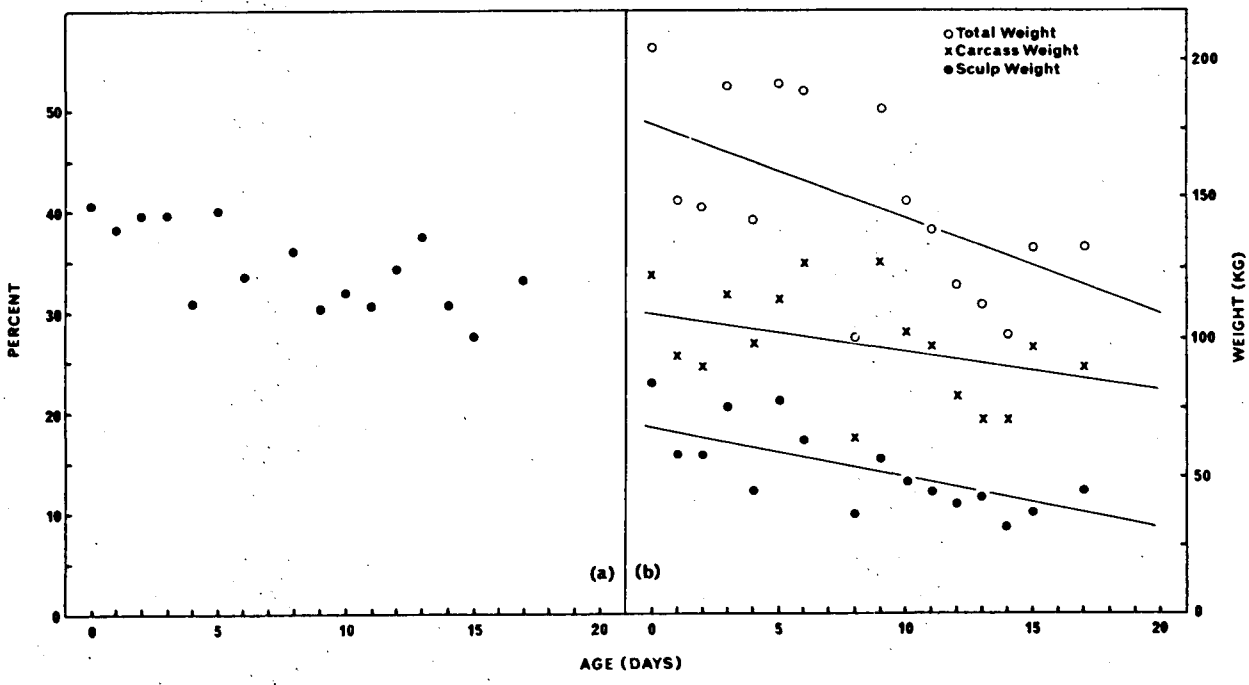

Fig. 4. (a) Sculp weight as a percentage of total weight in adult female grey seals killed a known number of days after giving birth; (b) total weight, carcass weight and sculp weight of the same adult females.

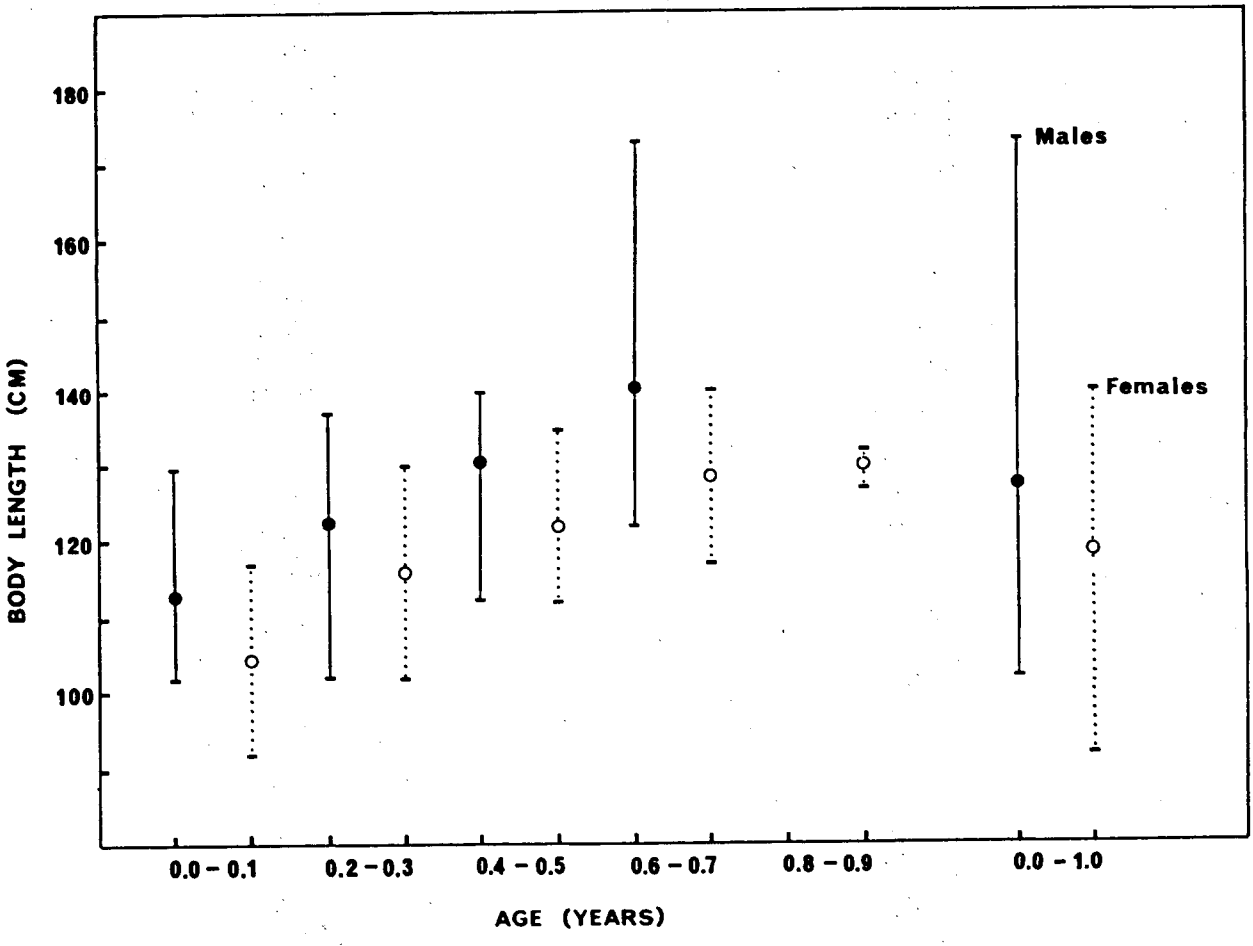

Fig. 5. Increase in body length with age during the first year.

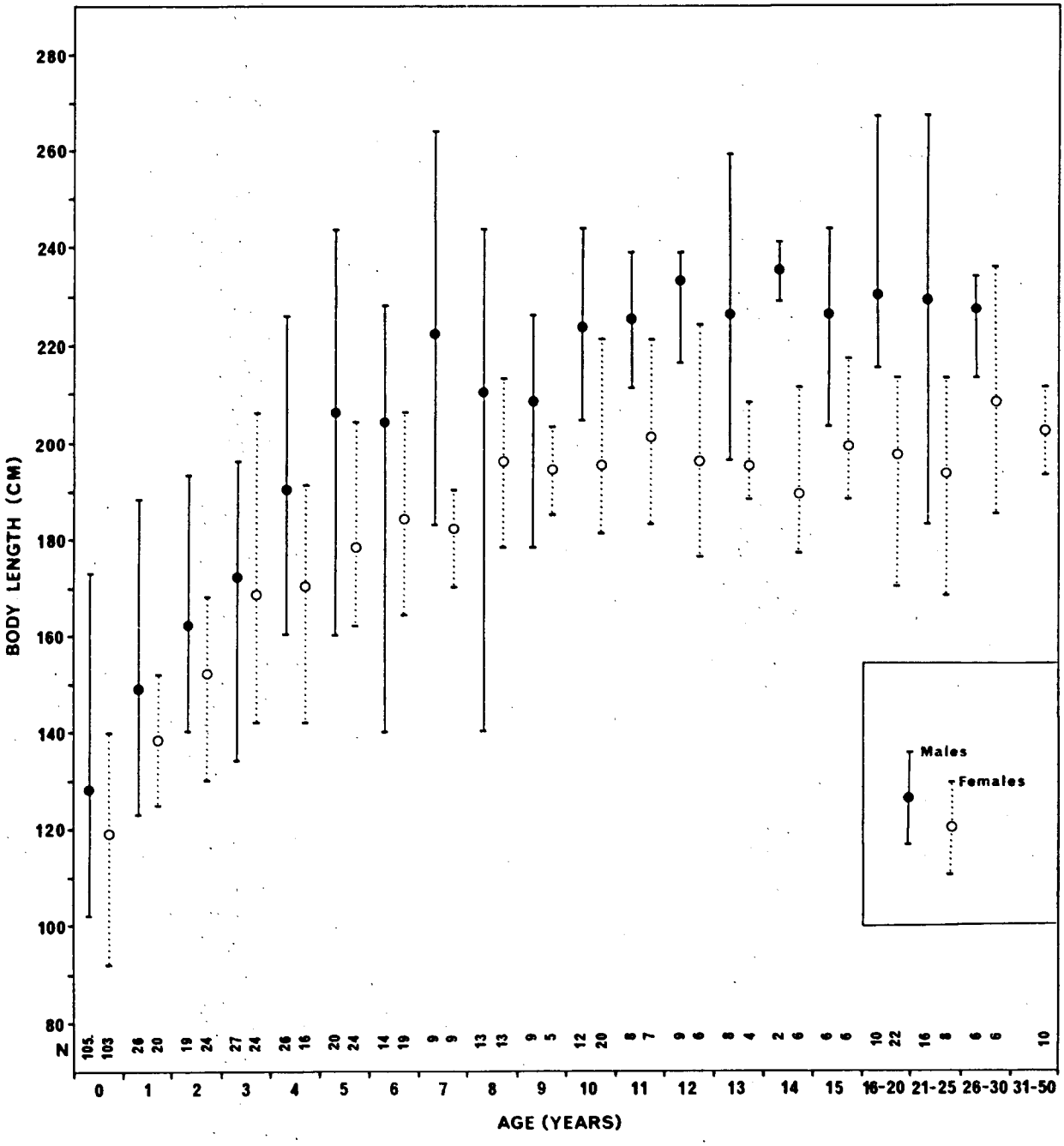

Fig. 6. Increase in body length with age in male and female grey seals.

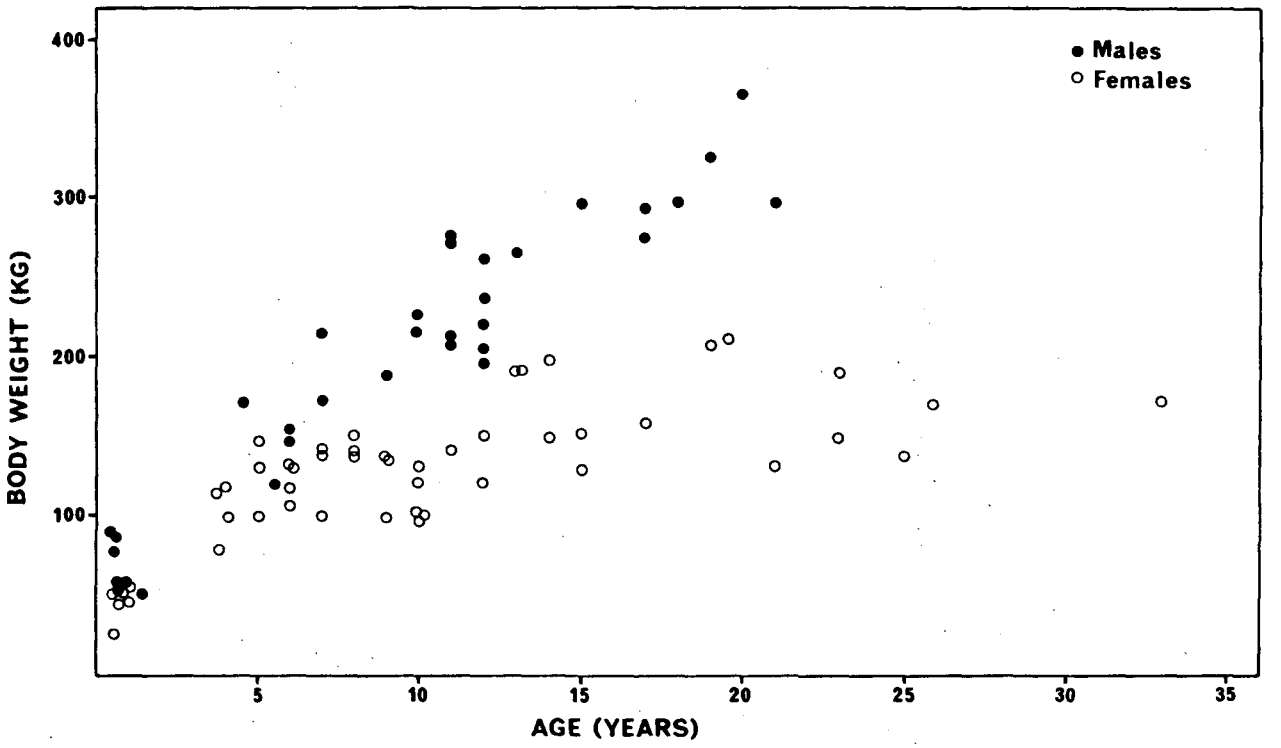

Fig. 7. Increase in body weight with age in male and female grey seals.