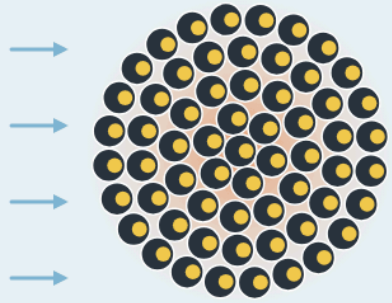
That is why

How do emperor penguins survive the Antarctic winter?

They pack into huddles that trap shared heat, shuffle in waves to keep it fair, and save heat in feathers and nose.

A A crowd that shares heat



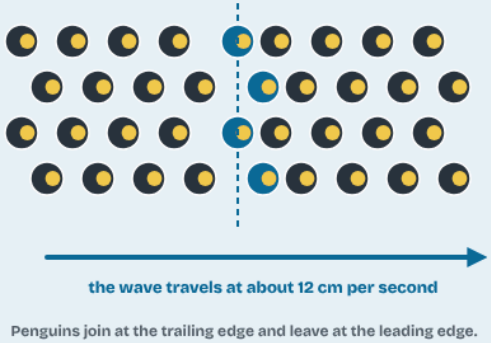
About 21 penguins per square meter. Seen from above, simplified.

Fasting through the dark

Male emperor penguins alone keep the egg warm, and fast for about four months (110 to 120 days). Huddling birds burn less: their metabolic rate dropped by 16% in one study.

Huddles come and go: on average 1.6 hours each.

B Small steps, moving in a wave



Penguins join at the trailing edge and leave at the leading edge.

1 Every 30 to 60 seconds

all penguins take small steps of 5 to 10 cm.

2 No jams

Waves keep the packed crowd from jamming.

C Three ways to keep heat

1 Huddle

Packed birds share their warmth: the air inside can reach 37.5°C.

2 Feathers

The plumage traps a layer of still air about 1.2 cm thick.

3 Nose

Cold-climate birds cool the air they breathe out in the nose, keeping back heat and water.

Pack together, keep shuffling, and lose as little heat as possible.

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