Image source: (Hoverfly/Author's own)

***Opening sequence fades into ANNOUNCER…

ANNOUNCER: Welcome to this week's episode of "bug business". Today we'll be looking at one of the most striking insects in the freshwater ecosystem; the dragonfly. Hovering just above the pond surface, the iridescent kaleidoscopic carapace of the nimble dragonfly might be mistaken for the shimmering reflection of water. Don't let their mesmerising morphology fool you though; these flying fancies are the apex predators of the wetland world. Interviewer Richard Cheshire meets 'Odonata'n expert Professor David Brooks to find out more...

***Camera pans across grassy wetlands. A large lake stretches behind the announcer, framed with rushes and waterfowl. Wind rustles through the reeds and there is the distinctive rustling/tearing noise of dragonfly wings.

INTERVIEWER: We're down here today in the New Forest National Park on the south coast of England, and I'm joined by Professor David Brooks. Professor, can you tell us a little bit about the area and its appeal for dragonflies?

EXPERT: Sure; the aquatic-terrestrial ecosystem here at New Forest is perfect for the varied needs of different stages in the dragonfly lifecycle. Dragonflies actually spend a good portion of their life underwater. Females deposit fertilised eggs in the water, the eggs hatch and nymphs remain underwater for a few more months feeding on aquatic invertebrates and moulting through several growth-stages. They will then emerge from the water, often on a plant stem like this, where the exoskeleton will split and the young adult will emerge.

INTERVIEWER: I can see several different species on this rock here. First, I have to say, look at those wings! They're like stained-

glass windows; the sun's even reflecting that amber colouration onto the rock below…

EXPERT: That's *Sympetrum flaveolum*, a female yellow-winged darter, and those wings aren't just for decoration. Some dragonflies, like the hawkers, can reach flight speeds of up to 30mph. Watch those huge greenish-blue *Anax Imperator*, or emperor dragonflies, patrol the pond surface near the centre of the lake. The males are quite territorial and if you watch them for a few minutes, you'll see them hover, turn abruptly mid-air, and very-speedily chase intruders. See how the wings are spaced on the body? They're directly connected to large flight muscles in the thorax that allow them to use each pair of wings independently. They're incredibly agile.

INTERVIEWER: I imagine that makes them a pretty formidable predator!

EXPERT: Absolutely. They're voracious carnivores with a predation-success rate of up to 95%. In the aquatic nymph stages, they actively seek out prey with incredible speed and deadly accuracy. There might be some zipping around in these reeds here… Yes! See this one chasing mosquito larvae. That quick burst of speed there is fuelled by releasing a jet of water from its anus…

INTERVIEWER: …like jet-propulsion?!...

EXPERT: Exactly. As for the airborne adults, very few insects can match their predation efficiency, and a single adult can eat hundreds of flying insects a day! The powerful wings are a huge asset here, but they also have incredible eyesight too.

INTERVIEWER: Hmm, I wasn't sure if that bulbous head was all eyes; they seem almost cartoonishly out-of-proportion…

EXPERT: They are indeed all eyes, and, like the wings, they aren't just for show. Take this common darter, *Sympetrum striolatum*. If we ignore the colouration, you can see the two large compound eyes that occupy most of the head. These produce almost 360° vision, with just a single blind spot behind their head – typical of an effective predator. They're made up of 30,000 simple lenses, with up to 33 opcins, or proteins, that dramatically increase their colour and light perception. As a comparison, you and I only have 3 opsins. If that weren't enough, there are also three ocelli, more eyes, there on the nose or 'vertex'. These simple eyes resolve basic images and detect light, which allows the dragonfly to orient themselves in flight.

INTERVIEWER: Incredible! So their vision is like UltraHD on super-fast broadband!

EXPERT: At the very least! They then obviously have excellent mid-air prey-detection skills. Their aerial agility and tough grip then

allow them to catch and consume prey mid-air with deadly proficiency.

***The pair pause to gaze over the buzzing lake.

INTERVIEWER: I'm glad their size means they don't pose a threat to us. I can't imagine I'd last long against a predator like that…

EXPERT: They're small now; but if you were around about 325 million years ago, you'd meet protodonatan *Meganeuropsis*, prehistoric dragonflies with a wing span of around 1m. Today, the largest the UK can offer are the emperor dragonflies with a wing span of about 10cm.

INTERVIEWER: Fun, but terrifying fact to end on! Thank you again Professor Brooks, for the fascinating foray into the world of dragonflies. Tune in next week for the spell-binding story of stick insects!

***Fade out to credits.

800 words
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