

Brodie Club Meeting

Meeting 907 of the Brodie Club was held in the Faunal Lab, Borden Building, University of Toronto at 8:00, on Tuesday, November 21, 1995.

Chairman : George Bryant

Secretary : Jennifer Young

Attendance

Fifteen members were present. Guests were Ken Abraham, guest of Hussel and Vicky Draper and Michael Boyer, guests of Fowle.

Minutes The minutes of the October meeting were approved as circulated.

Announcements-Norm Martin recommended the new book *Forest Plants of Ontario*, written by Karen Legasy, and published by the Canadian and Ontario M.N. R.

-Reynolds drew to our attention a copy of Fred Bodsworth's re-released book *The Last of the Curlews*. It was estimated that about a million copies of this book have been published world-wide.

-Lumsden showed the F.O.N. Christmas card, featuring a chickadee, which is being sold this year. He also indicated that the F.O.N. was sponsoring a trip to Antarctica in February, 1996.

-Carrick repeated his request for the minutes of meetings 898 and 899, November and December 1994. Members are asked to pay twenty-five cents for their coffee and cookies at the end of regular meetings. Carrick reminded members of the tradition of good cheer and Christmas treats which have been offered by some members of the club at the December meeting.

The Speaker Bruce Falls introduced our speaker, Dr. David Gibo, of Erindale College, who had spoken last to the club in 1985 on the flight patterns of Monarch Butterflies. This evening Dr. Gibo's topic was *Flight Tactics in Monarch Butterflies*.

In 1973 while noticing Monarchs soar up and over a building on the Erindale Campus, Gibo decided he would concentrate studying the soaring tactics of Monarchs. He was after all, a glider pilot. He soon found out that there was no published literature on the subject and had to do his own original research on the topic.

Gibo's talk centred around two points-the route the butterflies take from the Great Lakes Area to Mexico and the tactics they use to make this long journey possible.

The Monarchs travel in the mean direction of SW or WSW. However tagged butterflies captured by Urquhart indicated that they have been found scattered in other areas not directly on their SW route. There are several reasons for this divergence from the direct route. Butterflies prefer to make use of rising warm air in thermals to help them soar and thus travel efficiently. They are able to detect rising thermals from the ground at a success rate of over 95% and have been observed at 5000 feet by pilots. They spiral upward in a thermal, then flap along seeking another thermal, or glide down to lower levels until they find the next thermal. Indeed Monarchs, because of their efficient soaring ability, arrive at their over-wintering grounds with a 500 % weight gain-from 125 to 500 mgs.

Thermals always drift with the wind direction, which may not propel Monarchs most directly toward their destination. Tailwinds are best, headwinds restrict flight, and when there are crosswinds monarchs travel in a crabbing motion, going sideways. They do not travel as far using this method because their speed is offset by the crosswinds. Monarchs correct only for the left crosswinds, to avoid flying to a lower latitude. The rule seems to be to always keep going toward the goal and to never travel to a higher latitude. If soaring monarchs are carried by a thermal toward a higher latitude they must correct and fly to the right direction. They can travel within an area of 145 to 270 degrees, as long as they are making progress toward their goal. Monarchs travel SW until they reach the continental divide in Eagles Pass, Texas, where they turn left towards their over-wintering grounds SW of Mexico City.

Gibo had an Ultralight gliderplane modified to permit its use in butterfly flight research. The plane can fly a couple of hundred metres off the ground, and is equipped with long range fuel tanks, and an instrument panel that enables it to measure how strong the lift of the rising air is. Another method of collecting data was to use old WW II radar equipment. Gibo could detect the direction the butterflies were facing, their flight direction and wingbeat speed from a distance of a mile. But despite the advantages of equipment, the best data gathering activity remains standing a field and observing behaviour.

When Monarchs are airborne, they must turn into the wind until they perceive the land underneath them drifting by in the right direction just as birds and pilots do. They are able to measure the wind velocity and direction in order to decide whether or not to fly. Monarchs travel about six hours per day. If they have an ideal wind blowing they can reach Eagles Pass in 9 days. If they are travelling in the gulf states they may just wait until a favourable wind occurs until they turn west and then south. They stay low in the flowers feeding. They can adjust for height depending on wind velocity, and ride behind fronts. With a N wind, it is 360% more advantageous to soar in thermals than to flap close to the ground.

Monarchs in California also fly SW in fall migration, but of course cannot reach Texas and Mexico by so doing. They too turn south at the same latitude as their more eastern relatives. In spring they head northward and migrate to an area near the Grand Canyon. In Australia Monarchs go from SW to NE, gathering along the E coast and fly to over-wintering areas in the highlands. Their perception of a sun compass seems less important than their ability to detect variations of the magnetic lines of the earth and the angle at which they are flying relative to the magnetic lines.

The Buckeye is a much smaller faster and heavier butterfly than the Monarch. They too soar, but flap more in thermals than Monarchs, to avoid danger from predators. The higher they fly, the more erratic is their flight. When butterflies soar they don't produce heat. Although Monarchs can go to high altitudes in air temperature of 4 degrees C., Buckeyes are not able to do this. Other differences are that Buckeyes fly only in tailwinds, can't compensate for crosswinds, and require a higher temperature before they can begin to fly. They begin and stop later in the day than Monarchs. Whereas Monarchs spend 3/4 of time in air gliding and soaring, Buckeyes spend less than half of that of Monarchs. Mourning Cloaks, Painted Ladies and Blue Fritillaries soar, but their flight tactics have not yet been studied.

Questions-Speakman asked if monarchs return after spending winter in Mexico. *It is thought that after the first winter they return as far north as the gulf*

states , and those that arrive here are the second or third generation from Mexico. Lack of evidence is the problem.

Can you explain the tremendous gain in body weight? It is due to the ability to soar, quit early in the day to feed, preferably on red clover, and their resting metabolism is low. The energy required to flap as compared to soar is 20:1.

Is the milkweed the same species in Australia as here in Canada? Yes, it is the common plant here. Both the milkweed and the monarchs have been introduced to Australia. Monarchs now exist throughout the Pacific islands.

Reynolds-Is there any significance to large concentrations of monarchs? The large concentrations occur when there is good foraging areas, near isolated trees where they can roost overnight, and winds not in their favour. Also, they will not cross large bodies of water without a favourable wind.

Hussel-Do they start to roost on the E side of the trees? Late in the afternoon they begin on the SW side of the trees and move around the tree as it fills up.

Bruce Falls-Is there any evidence that butterflies can detect magnetic fields? Although butterflies can absorb magnetic dust particles, but they themselves do not inherently contain any magnetism.

Does the California population of Monarchs have any different information, given that they over-winter in a different area from the Monarchs from the Great Lakes area? No DNA evidence has been found to show that Californian butterflies are different from the rest of the species.

When the butterflies get to the Gulf and turn south, couldn't the turn be caused by an aversion to flying over water? They begin to turn 200 km inland, near the Rockies, where the magnetic deviation is about 20 degrees out of line- perhaps that is why the turn south here.

What about dragonflies? They fly due south, use thermals as do butterflies and come down to rest late in the afternoon .

Fowle-Do trania soar? Yes, they are adapted for soaring, and take advantage of every shift of wind.

Currie-Would migrating hawks eat dragonflies? Yes, but dragonflies depend upon their manoeuvrability to avoid predators.

Hussel- What about the huge migration of moths in Panama? *Urania* moths migrate east to west in Panama.

Norma Martin-Do any other insects go to a specific area as the Monarchs do? Some species in China migrate to a specific area.

Do they feed in the day in the mountains and return at night? They go into the mountains in winter and back down in the spring .

Boyer- Is distribution of the insect the same as the host plant? Yes, they eat any varieties of the host plant.

Bruce Falls-Do monarchs jump thermals just as hawks do? Yes, and the best time to see this is in a S wind.

Speakman- Did those butterflies raised in a plastic box show no sense of orientation? No, they had no magnetic moment unless they had been exposed to the air.

Fowle thanked the speaker for his unusually stimulating talk.

Members' Observations

Speakman observed three separate flocks of Bohemian waxwings feeding on wild grapes near Beaverton.

Hussel saw a flock of 50 Bohemian waxwings in Ottawa.

Currie reported flocks of about 800 waxwings had been seen in the Pinery, also Kortright Centre and Glen Haffey area.

Hussel saw red-throated 110 loons flying around over the Ottawa River.

Fowle reported that the International World Conservation Meeting is having its conference in Montreal in October 13-23, 1996. 2000 members from 130 countries are expected to attend.

Currie reported 36 red-throated loons flying over the lake near Van Wagners Beach. As well, there were 5 kittiwakes, a purple sandpiper at Niagara, and perhaps a female Goldeneye.

Bruce Falls observed a male cardinal has during the past three weeks, persistently attacked his window, despite measures taken to discourage it.

Norma Martin reported that their attacking cardinal hit the window feet first.

Bryant declared the meeting adjourned at 9:45.

The next meeting will be held on Tuesday, December 12.
Please note change of date.

The SPEAKER will be Anders Brodin, Swedish Researcher currently visiting the Dept. of Psychology, U. of T.

SUBJECT: Food Hoarding in Titmice & Chickadees.

- Illustrated with Slides