



# THE BULLETIN

Dec 2008 / Jan 2009 No. 477

## 2008-2009 EXECUTIVE

President	Marianne Yake . . . 905-883-3047 <a href="mailto:president@rhnaturalists.ca">president@rhnaturalists.ca</a>
Past President & Speakers	Natalie Helferty <a href="mailto:speakers@rhnaturalists.ca">speakers@rhnaturalists.ca</a>
2nd Vice President	-- Position Available --
Secretary	-- Position Available --
Treasurer/Secretary	Gene Denzel <a href="mailto:treasurer@rhnaturalists.ca">treasurer@rhnaturalists.ca</a>
50 <sup>th</sup> Anniversary Field Trips	Michael White Tom Waechter <a href="mailto:trips@rhnaturalists.ca">trips@rhnaturalists.ca</a>
Environment Publicity	-- Position Available -- Nancy Zalman <a href="mailto:publicity@rhnaturalists.ca">publicity@rhnaturalists.ca</a>
Bulletin Editor	Lloyd Helferty . . . . 905-707-8754 <a href="mailto:editor@rhnaturalists.ca">editor@rhnaturalists.ca</a>
Membership	Mike Turk <a href="mailto:membership@rhnaturalists.ca">membership@rhnaturalists.ca</a>
Events	-- Position Available --
Ontario Nature Rep Website Admin	Diana Piché Rod Potter <a href="mailto:webmaster@rhnaturalists.ca">webmaster@rhnaturalists.ca</a>
Chair of AstroNats	Heidi DeBond

## Events calendar

- Botany Group** **Monday February 2, 2009.** 12:30pm.  
Topic: Aquatic plants  
Location: 53 Bridgeport, Richmond Hill
- Executive Meeting** **Tuesday February 10 , 2009.** 7:30pm  
Location: Robert Holland Centre
- Bird Group Meeting** **Wednesday February 11, 2009.** 7:30pm  
Topic: Savannah and Song Sparrow  
Location: 190 Grandview Av, Thornhill
- General Meeting** **Thursday February 19, 2009.** 7:30pm  
Speaker: Joseph Steyr  
Topic: Pollination Canada  
Location: Richmond Hill Presbyterian Church

**Check for more Events and Outings on Page 2**

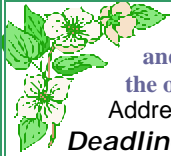
## Conservation Review Board Hearing on the Heritage Status of the David Dunlap Observatory ( From the Oak Ridges Friends of the Environment e-newsletter )

The Conservation Review Board will hear arguments about the extent of heritage designation that should be assigned to the David Dunlap Observatory and affiliated buildings and equipment as well as the 189 acre farm property upon which it is situated. The parties appearing before the Board are the Richmond Hill Naturalists, Observatory Hill Ratepayers, the Town of Richmond Hill and Corsica Development each with their own view of the degree of protection that should be established. There is a range of protection being proposed from designation of the total site and contents by the Richmond Hill Naturalists to a much more limited scope as projected by the developer who purchased the property from the University of Toronto.

On the basis of this hearing, the Board will make a recommendation to Richmond Hill Council as to how it should finalize its by-law defining the heritage designation. The hearings are open to the public and the Chair of Board will designate some time when public comments will be heard.

This is an issue of great importance to many residents of Richmond Hill due to the long history of the Observatory as a vital part of the community, its historical significance and the serious potential for the reduction of green space in the southern part of the Town. A sizeable audience at the hearings would help convey residents' concerns about the future of the site to the Board.

Meetings take place on January 15 & 16 and January 19 thru 23 from 10am-4pm at the Town of Richmond Hill, Committee Room 2, 225 East Beaver Creek (North of Hwy #7, West of the 404 and East of Leslie Street).



*The Bulletin* is published 9 times per year, from September to May inclusive, by the **Richmond Hill Naturalists**, and is mailed free to members. The Bulletin is the official publication of the Richmond Hill Naturalists, a non-profit organization the objectives of which are to stimulate public interest in natural history and to encourage the preservation of our natural areas.

Address Correspondence to: **Richmond Hill Naturalists, P.O. Box 32217, RPO Harding, Richmond Hill, ON, L4C 9S3**

**Deadlines:** The editor encourages submissions from any member on any topic related to nature or conservation, and in particular, any issue that might be of interest or concern to members of this club. e-mail: [editor@rhnaturalists.ca](mailto:editor@rhnaturalists.ca) **Deadlines are the 2nd Thursday of each month.**

**Bulletin Advertisers** have been selected because of their relevance to member interests.

Members are encouraged to patronize our advertisers and please mention that you saw their ad in our Bulletin.

**Change of Address:** Any change of email or street address should be sent to Mike Turk who prints the envelopes for the Bulletin mailing. See the Executive List for contact information.

Editor: Lloyd Helferty

Mailing Database: Mike Turk

Distribution: Athena Antiochos










#### MEMBERSHIP IN RHN

The *Membership Application Form*, is available at each General Meeting from Mike Turk, or in our club brochure, available from any executive member. You may also sign up or renew at <http://www.rhnaturalists.ca/membership/>

#### NEW MEMBERS:

*Meet new members at club events and say Hello!*

## EVENTS FUTURE

-  - **Sunday January 25, 2009.** 1:30pm–4:30pm. **Gulls and Waterfowl – Sunnyside.** Leader: Glenn Coady. Meet in the Sunnyside Parking Lot at the foot of Windermere Avenue. Dress warmly.
-  - **Sunday February 1, 2009.** 8am–4pm. **Magical Mystery Tour.** Leader: Dave Milsom. Meet in the parking lot at Vellore Hall. Destination(s) will be based on recent bird sightings in the GTA. Bring lunch, binoculars, and a sense of adventure.
-  - **Monday February 2, 2009.** 12:30pm. **Botany meeting.** The next meeting will be held at the home of Freddie Whillan at 53 Bridgeport. The subject under discussion will be aquatic plants. Call Marion Martindale 905-889-1690 for details.
-  - **Friday February 6, 2009.** 7:30pm. Richmond Hill **Astronats** – Astronomy Night Sky Viewing at Phyllis Rawlinson Park, North of 19th Avenue off Leslie Street, Richmond Hill.
-  - **Saturday February 7, 2009.** 9am–4pm. **Fisherville Area, Haldimand/Norfolk County** (OFO Trip). Meet in the parking lot of the high school at the north end of Cayuga on County Road 54. Hawks, owls, Snow Buntings, Lapland Longspurs, sparrows. Leader: Dave Milsom.
-  - **Sunday February 8, 2009.** 9am–1pm. **Winter Birds – Durham Region.** Meet at the S.W. corner of the Pickering GO Station parking lot (Bayly/Liverpool) to car pool if necessary. Bring a lunch, dress warmly. Leader: Rayfield Pye.
-  - **Tuesday February 10, 2008.** 7:30pm. **Executive Meeting.** Robert Holland Centre, Phyllis Rawlinson Park.
-  - **Wednesday February 11, 2008.** 7:30pm. The **Bird Group** will meet at 190 Grandview Av, Thornhill. The topic this month will be Savannah and Song Sparrow. For more information about who will present what or for directions, contact Dana Jonak at 905-881-0603 or Theo at 905-889-1554.
-  - **Thursday February 19, 2009.** 7:30pm. **General Meeting.** Joseph Steyr from Pollination Canada. We will be shown information about all of the pollinators and introduced to their new "citizen scientist" program. See their website at [www.pollinationcanada.ca](http://www.pollinationcanada.ca). The meeting will take place at the Richmond Hill Presbyterian Church, Wallace Hall. 10066 Yonge St., North of Major Mackenzie Dr., West side. For info contact Marianne Yake at 905-883-3047, or visit [www.RHNaturalists.ca](http://www.RHNaturalists.ca).

Please note: Richmond Hill Naturalists welcomes anyone to volunteer as an outing leader.



- **Friday and Saturday January 16 & 17, 2009. *Green Reel Environmental Film Festival*** at the City Playhouse. Documentaries, Hollywood entertainment and independent productions. \$5 per screening, \$12 day pass, \$20 Festival pass. The City Playhouse is located south of Highway 407 on the west side of Bathurst Street. The Richmond Hill Naturalists are setting up a booth to promote our membership and the Conservation Review Board hearing on the David Dunlap Observatory. For info contact Darcy Hoover at the City Playhouse Theatre 905-326-7469 or visit [www.greenreelfilmfestival.com](http://www.greenreelfilmfestival.com).

### Upcoming birding outings with neighbouring clubs

There are a number of outings coming up which are bird-related.



- The first set consists of those led by the **West Humber Naturalists** (organized by Ron Fleming). Our members have been welcome in the past to participate in these. The dates and details can be found at <http://whnforum.pbwiki.com/Upcoming+Field+Trips>.



- The second set consists of those run by the **Toronto Ornithological Club (TOC)**. They run a variety of outings, the details of which can be found at [www.torontobirding.ca/club/outings.php](http://www.torontobirding.ca/club/outings.php). For all of these, car-pooling is encouraged, dress appropriately for hiking outdoors, and bring binoculars.



- **Saturday May 30, 2009. Ontario Nature's AGM** will be held on at the Bruce County Museum in Southampton and will take place in partnership with the Huron Fringe Birding Festival. The Huron Fringe Birding Festival runs from May 22-25 & May 28th- 31st, 2009 at MacGregor Point Provincial Park.



- **July and August, 2009. *Painting Tours of France and Italy*** with Valerie Kent. Tuscany, Normandy and Provence. See <http://valeriekent.com> for more info.

## MEMBER SUBMISSIONS

### DDO hearing begins Thursday morning

It's a battle 75 years in the making, and it starts Thursday.

Arguments about the future of the David Dunlap Observatory go before a provincial Conservation Review Board (CRB) on January 15 until January 23. The board's decision will have a significant impact on what kind of development, if any, takes place on the 190-acre site off Bayview Avenue, north of 16th Avenue.

Here is everything you need to know.

#### WHAT IS THE CRB?

It is a branch of the provincial Ministry of Culture, they hear disputes involving the protection of properties considered to hold cultural heritage value, as defined by the Ontario Heritage Act

#### WHO IS PARTICIPATING IN THE HEARING?

The Town of Richmond Hill has proposed a bylaw outlining the site's western half - almost half of the 190 acres - is worthy of a cultural heritage landscape designation (see below). They may seek other protections for the eastern part of the site, but that is beyond the purview of the CRB.

Three parties voiced objections to the by-law.

...cont'd



**Metrus** is the site's owner, having purchased it from the University of Toronto last summer. They are creating a development plan which includes preserving the site's three key historic buildings: the dome, the administration building and the Elm's Lea farmhouse.

The **Richmond Hill Naturalists** want to see 100 per cent of the site preserved, including the buildings and their contents. They hope research can continue at the observatory.

The **Observatory Hill Ratepayers** similarly want 100 per cent protection, highlighting the importance of woodlots, and hope to provide a voice for ordinary citizens.

**WHAT IS A CULTURAL HERITAGE LANDSCAPE?**

This is a new concept in Ontario where a portion of land, not just a single building, can be argued to have a significant history. So far, it has only been employed once, at the homestead of Sir Frederick Banting in Alliston.

**IS THE BOARD RULING BINDING?**

No. Unlike a decision at the Ontario Municipal Board, the conservation board only makes a "recommendation" on a proposed municipal bylaw. After their decision, the town should pass a bylaw taking the decision into account.

It is a layer of protection through which any development proposal has to proceed. If, for example, Metrus subsequently presents a development plan which is rejected by the town, the heritage protection would be considered at an appeal.

**WHAT IS A HEARING LIKE?**

The hearing is quasi-judicial, meaning experts and lawyers testify, but it is less formal than a court of law.

**CAN I ATTEND?**

Yes. The seven days of hearings are open to the public, but seating is limited and available on a first-come-first-served basis. Note, however, the first morning is set for a site visit for the board and party members only.

The board sits in Committee Room 2 at the Town Hall (225 East Beaver Creek Rd. E.) starting at 10 a.m. They do break for lunch and hearings wrap up at 4 p.m.

From <http://www.yrng.com/article/86610> Written by: David Fleischer, Staff Writer, yorkregion.com

Check <http://yorkregion.com> and The Liberal ([www.theliberal.com](http://www.theliberal.com)) for daily updates on the hearing.



- submitted by M. Yake

The Conservation Review Board hearings run from 10:00am. to 4:00pm, starting on Thursday January 15, weekdays, concluding on Friday, January 23. There will be time for public presentations, but the timing of these is unknown. If you wish to make a presentation, you can do so by signing up in person the first morning.

The site visit is scheduled for 9:00am Thursday Jan 15. The public can show support by coming on the property that morning, but will not be allowed into the buildings. Park on Hillview and walk in.

On other days the public is welcome to come and hear about the rich history of this property and learn all about our community builders such as the Marsh, Vanderburgh, Dunlap, Hogg & Chant families.

More information is available on the Richmond Hill Naturalists' web site, [www.rhnaturalists.ca](http://www.rhnaturalists.ca) and the Town of Richmond Hill web site at: [www.richmondhill.ca/subpage.asp?pageid=david\\_dunlap\\_observatory](http://www.richmondhill.ca/subpage.asp?pageid=david_dunlap_observatory)  
Information on the Conservation Review Board can be found at: [www.crb.gov.on.ca/english/home.html](http://www.crb.gov.on.ca/english/home.html)

Wild Birds Unlimited  
Nature Shop  
Debbie & Andy Neale  
Owners  
8150 Yonge St.  
Thornhill, ON, L4J 1W5  
Phone: (905) 709-3775  
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## Bird Study Group

In November the Bird Study Group met at Theo Hofmann's house to discuss the characteristics of the White-crowned and White-throated Sparrows.

After some tasty refreshments we got into a detailed description of each bird, followed by discussion of the field marks and features which aid in field identification. Both of these birds can be seen here in Richmond Hill during migration, although they do not breed here (the far North for the White-crowned, and somewhat North for the White-throated). However, it is usual for a few White-throated to linger for most or all of the Winter, sometimes feeding on the ground where seeds spill from feeders. This year we had both species on the Christmas Bird Count.

Theo Hofmann brought up an interesting bit of research about the nature of the migration for these birds. There is a Western population of the White-crowned species which migrates down the California coast. Apparently, some young of that species were taken before migration, brought to the East coast, and fitted with radio transmitters.

It turned out that when the time for migration came, they moved out over the Atlantic (on a vector which would have made sense out West), and flew until the signal was lost. Birds which were allowed to migrate with the rest of their home flock, in comparison, did fine. Clearly these young do learn something about the migration route from older birds.

This is in sharp contrast to what happens with, for instance, most migrating shorebirds. Here the adults tend to migrate well in advance of the young, who find their own way later to the target destination, often over very long routes. Whatever mechanism(s) operates for birds to find their way clearly is different in these two groups.

Lots yet to be learned!

The evening concluded with the traditional quiz, in this case a variety of colour snaps of different species requiring quick id's after a short look. Some did much better than others.



## Margaret Rusnell: A Tribute

It was with sadness that I heard of Margaret Rusnell's passing on December 11, 2008. When I first met Marg in 1979 at their home, Tullimaar, she made a deep impression on me with her loving and fierce dedication to nature causes from international to local issues. She and her husband Arthur were instrumental in starting the West Humber Naturalists Club in 1978 for naturalists living in Vaughan, King, Caledon, Etobicoke, and Brampton as an offshoot of the Richmond Hill Naturalists Club. Many supporters from the Richmond Hill club also joined West Humber.

Some of the early days saw Art cooking pancake breakfasts on the big veranda of their home for club members in the spring. As the club's first social convener, Marg always made a point of greeting new people at each monthly meeting and introducing them to other members. Together Marg and Art achieved much, Marg like the lead singer and Art like the backup band steadfastly supporting her. She was not shy about giving someone a dressing down if she felt they needed it and this was always done with a genuine concern and not malice.

I feel like an era has come to an end. As the "Roving Rusnells" they traveled extensively throughout the world and lived for a time in East Africa and Jamaica. The Greeks imagined an afterlife of the Elysian Fields, a paradise of beautiful meadows, streams and mountains. I imagine Marg now joining Art and many other West Humber and Richmond Hill Naturalists before them like Arn Dawe, Gerry Bennett, Peter Ford, Dean Newton, Dolores Tilt, and Ottelyn Addison happily birding these Elysian fields where rare and extinct species of birds, plants and animals now dwell. Perhaps a consequence of getting older, I continue to feel as if I am losing an extended family of aunts and uncles who were all great naturalists of these nature clubs. Marg and Art were certainly two of the best.

- Gordon Cameron

## NATURE NEWS

The **High Park Community Advisory Council** ([www.highpark.org](http://www.highpark.org)) advises the City of Toronto on general Park and Trail management, provides stewardship of natural areas in the Park, co-ordinates the restoration and rehabilitation of water systems ponds and creeks within the Park, and assists with plant sales and the restoration of Black Oak savannah and woodlands. They have recently published a new book "**Rare Plants of High Park – Endangered Black Oak Savannah**"

The **Toronto Field Naturalists** [TFN] ([www.torontofieldnaturalists.org](http://www.torontofieldnaturalists.org)) are celebrating their 85th Anniversary! Wendy Rothwell ([wbrothwell@sympatico.ca](mailto:wbrothwell@sympatico.ca)) became the new president of the club this year and it was reported that the club provides 140 outings, produces 8 issues of its newsletter, has an extensive lecture series given at Emmanuel College, 75 Queen's Park Crescent East in Toronto, owns 437 acres of land in 4 Nature Reserves and have recently added a **Toronto and Area Bird Checklist** to their website, which you can find by going to: <http://www.torontofieldnaturalists.org/birdchecklist.pdf>



### Amazon Deforestation Trend on the Increase



On January 6, 2009 ScienceDaily reported that deforestation in **Brazil's Amazon forests** has flipped from a decreasing to an increasing trend. According to new annual figures recently released, from August 2007 to July 2008, Brazil deforested 11,968 square kilometers of forests in the area designated as the Legal Amazon, a 3.8 per cent increase over the previous year. See: [www.sciencedaily.com/releases/2009/01/090104093542.htm](http://www.sciencedaily.com/releases/2009/01/090104093542.htm)

## EVENTS PAST



The 2008 **Christmas Bird Count** for the Richmond Hill Circle was held on 20 December 2008. There were 34 field observers and 9 feeder-watchers. A total of 54 species (plus a hawk and a gull of unknown species) were observed, totalling just shy of 4500 birds.

These numbers are fairly typical. The highlights included a Northern Goshawk, THREE b , a Swamp Sparrow, a Fox Sparrow, a Yellow-bellied Sapsucker, a White-crowned sparrow, two Northern Flickers, a Snowy Owl and 48 White-winged Crossbills. The weather was cold but not too windy.

A large group of participants enjoyed the Chilli Supper hosted by Martin and Judy Chen. In addition to lots of good food and drink, people vied at a variety of quizzes, and the drawing of several door prizes. There was even a spirited rendition of "The Twelve Days of Christmas".

Our thanks again to **Wild Birds Unlimited** for providing prizes for the lucky participants.

## GENERAL INTEREST



### Ontario Nature Conservation Awards

The **Ontario Nature Conservation Awards** recognize excellence by honouring individuals, groups, government agencies and corporations who have worked to protect Ontario's nature. There are 11 awards in total including the newest award – the "Steve Hounsell Greenway Award", which recognizes an individual or group for adding a vital linking piece to Ontario Nature's "Greenway", or any other action that contributes to the Greenway vision. For more details on the awards visit [www.ontarionature.org](http://www.ontarionature.org) and refer to the awards flyer. You can download the nomination form at: <http://www.ontarionature.org/home/canomination.html>

Winners of the Conservation Awards will be honoured at the awards ceremony on May 30, 2009 at the Bruce County Museum.

The deadline for nominations for the Ontario Nature Conservation Awards is March 6th, 2009.



### How to buy an election

Election campaigns in Toronto's satellite municipalities are overwhelmingly bankrolled by corporate money, most of it from the same developers responsible for cascading sprawl.

In the '905' area surrounding Toronto in 2006, the election winners got 54.3% of their funding from developers. The losers – 35%. In Toronto, the numbers are 12% and 4% respectively. All this money, combined with shortcomings in the Ontario Municipal Elections Act, puts new candidates at a disadvantage, especially those who oppose developers' interests.

According to figures produced by Robert MacDermid, an associate professor of political science at York University, Pickering and Vaughan city councils are the most beholden to corporate interests. Collectively, corporate gifts accounted for 76.7% and 62.8%, respectively, of recorded campaign donations to candidates in those cities.



Both Ajax and Toronto have actively discouraged corporate and union donations. Last week, Toronto's executive committee voted 7-4 to ban them, though the decision must still go before city council.

Long-serving Ajax mayor Steve Parish, who does not take money from developers, said he believes that accepting corporate donations instills an "inherent bias" in councils toward development, regardless of the community's best interest.

It's unlikely the province will ban corporate and union donations at the municipal level because provincial parties allow corporate and trade union contributions.

- Submitted by M. Yake, based on an article by Iain Marlow of the Toronto Star

### Protect Birds from Window Collisions

I have a very sad story of how I discovered hummingbirds were nesting in our big spruce trees on our farm on St. Joseph's Island. The house on the farm had a large living room window facing the spruce grove. One summer I found several dead hummingbirds on the deck. I was very upset and realized they were flying into the reflection of the spruce trees in the window. Of course we did what we could by pasting up cutouts of hawks and letting the window get dirty and rain-pattered so it was not as reflective. Hummingbirds and other birds that come near human habitation can easily collide with windows and other reflective surfaces. Many ornithologists now believe that this is the single greatest cause of mortality among birds, apart from habitat loss.

Homeowners and businesses can do their part by reducing or eliminating the reflectivity and transparency of glass. On small panes of glass a couple of hawk silhouettes or anything else pasted on the outside of the window or hung in front of the window may alert the birds to the presence of an obstacle. For large windows the best option is to cover the window with a screen or an opaque film. For more information and suggestions on what you can do to prevent window collisions visit [www.flap.org](http://www.flap.org).

If you do find a live bird that has hit your window place it in a cardboard box or paper bag - making certain that it is sitting upright, not lying on its side (place it inside a donut made of tissue if the bird will not stay up) - and wait for an hour to see if the bird recovers on its own. If not, contact your local wildlife rehabilitation facility for instructions (in the Greater Toronto Area contact the Toronto Wildlife Centre at (416) 631-0662).



### AstroNats



The One-Minute Astronomer has a page with "**25 Tips For The Frugal Astronomer**" that includes such things as star and moon maps, college-level courses, software, free web sites, tips on choosing a telescope, information on monthly phenomena and astronomical highlights, books and even instructions for making your own telescope.

Find it at [www.oneminuteastronomer.com/OMALibrary/frugal-astronomer.html](http://www.oneminuteastronomer.com/OMALibrary/frugal-astronomer.html)

The Richmond Hill Naturalists invite you to join an Astronats field trip, "**How to Navigate the Night Sky**". Join us and enjoy an evening of exploration right in the middle of town!

Come meet amateur and professional astronomers on the **First Friday of every month**, up to and including the month of May. Meet at 7:30p.m. at **Phyllis Rawlinson Park**, 11715 Leslie Street in Richmond Hill.

(Located North of 19th Avenue and south of Stouffville Road on the east side.) Come to the end of the driveway.

→ If it's cloudy, the alternate date for the event is the second Friday of the month.

Participants should dress warmly: layers, outdoor shoes, gloves, hats. Please bring binoculars and a flashlight. Cover the flashlight lens in red tissue paper. Some telescopes will be provided.

RSVP: Marianne (905) 883-3047 or [president@rhnaturalists.ca](mailto:president@rhnaturalists.ca)

### BIRD OBSERVATIONS



An aerial **Whooping Crane** census was conducted November 14, 2008 of the **Aransas National Wildlife Refuge**, which is located in coastal Texas. Present were 210 adults and 29 juveniles giving a total of 239 birds.

A second aerial census of the Whooping Cranes was conducted November 25, 2008. The results showed that the number has reached the same level as last year and may become even higher – possibly even hitting a record of 273 birds! The peak population in the winter of 2007-08 was 266. Crane monitoring involves cooperative efforts and support by the US Fish and Wildlife Service in cooperation with the Canadian Wildlife Service, plus many volunteers and non-profit organizations along the way.



Please submit Bird Observations using our electronic database, which can be found at: [www.rhnaturalists.ca/bird\\_sightings\\_form.php](http://www.rhnaturalists.ca/bird_sightings_form.php)

Submissions can be sent by e-mail to:

[Sightings@rhnaturalists.ca](mailto:Sightings@rhnaturalists.ca) or [birds@rhnaturalists.ca](mailto:birds@rhnaturalists.ca)

Written submissions can be sent by surface mail to:

Gene Denzel, 9 Idleswift Dr., Thornhill, ON L4J 1K8

Bird observations are viewable online or, if you prefer to receive a paper copy of this month's bird observations, contact Marianne Yake at 905-883-3047.

## From the Editor

### Chagga home gardens A sustainable multi-storey agro-forestry cropping system



On Mt. Kilimanjaro in Northern Tanzania one can find the Chagga, a tribe of Bantu speakers descended from various tribes who migrated into the once-forested foothills of Mt. Kilimanjaro. These people began the process of transforming the native forest to provide fodder, fuel, and fruit by continuously refining and testing different techniques over the ages and handing this information down from one generation to the next.

Over time, useful species were retained while the less useful ones were eliminated and replaced with new tree and crop species. This process is still continuing on Mt. Meru, a neighbouring mountain.

Mt. Kilimanjaro is one of the most densely populated areas in Tanzania, largely because of the ecological and economic success of the Chagga cropping system. The home gardens enable the farmer to sustain production with a minimum of external inputs.

The Chagga have an intimate knowledge of the various crops and plants and their ecological requirements. The intensive cropping system of the Chagga involves the integration of several multi-purpose trees and shrubs with food and cash crops and livestock on the same piece of land.

A single garden might grow bananas, beans, cabbage, cow peas, eggplant, maize, onion, potato, sweet potato, taro, tomato, and yam along with producing coffee, cardamom, milk, poultry, and eggs. In a typical home garden up to 15 different types of banana might be grown, including cultivars for food, brewing, mulch and fodder along with an average of 39 other trees and shrubs retained and managed to encourage the natural regeneration of valuable timber.

The bulk of the crop is grown inter-cropped with beans and finger millet, an important crop used for brewing and making porridge. Cattle are kept for milk, while goats and pigs are reared for meat. Farmers on average have three cows, two goats, and six chickens, and in some cases a pig is also kept. Livestock are stall-fed with fodder from trees and shrubs, banana plants and grasses grown on the homestead. The spatial arrangement of components is irregular and looks very haphazard, with the trees, shrubs and food crops closely intermingled.

Farmers carry out various operations such as opening up the canopy to ensure better fruiting of the coffee, spacing out the banana stools, and manuring the different crops whenever they think the time is right. They maintain plant species that repel or eradicate various pests and know the best fodder trees and shrubs and when and how to lop them. Each home garden has a network of irrigation and drainage furrows linked to other home gardens in the vicinity to tap and use runoff from the other home gardens on the forest slopes above.

The average size of a home garden is only 0.68 hectares and the great majority of home gardens are intensively cultivated and well managed by about four family members for of an average household of 10 people, producing about 125 kg of beans, 280 kg of coffee (accounting for over 50% of Tanzania's coffee exports), 275 bunches of bananas and 5 kg of honey per year.

The Chagga cropping system has been stable for at least a century and it is only recently that it has come under pressure from rapid population growth and diminishing land resources.

More information along with some images of the gardens can be found at:

[www.css.cornell.edu/ecf3/web/new/af/homeGardens\\_02.html](http://www.css.cornell.edu/ecf3/web/new/af/homeGardens_02.html)

Lloyd Helferty, Bulletin Editor [editor@rhnaturalists.ca](mailto:editor@rhnaturalists.ca)

905.707.8754 Mailing Address: 603-48 Suncrest Blvd. Thornhill, ON L3T 7Y1

