

The First Record of Golden-winged Warbler (*Vermivora chrysoptera*) in British Columbia.

By Rick Toochin. Submitted: April 15, 2019.

Introduction and Distribution

The Golden-winged Warbler (*Vermivora chrysoptera*) is a stunning passerine that is found breeding in eastern North America (Sibley 2000). In overall distribution, this species breeds in the higher elevations of the Appalachian Mountains and the northeastern and north-central United States (Dunn and Alderfer 2011), with a disjunct population from southeastern Ontario (Peck and James 1987) and adjacent Quebec (Godfrey 1986) northwest to Minnesota (Janssen 1987) and Manitoba (Godfrey 1986, Cumming 1998). The Golden-winged Warbler occurs in localized sites in the Cumberland and southern Blue Ridge Mountains from extreme northern Georgia (Klaus 2010b) and western North Carolina (Swarthout *et al.* 2009), north and east to higher elevations of Tennessee (Bulluck 2007, Bulluck and Buehler 2008). It is rare in hilltop removal sites in southeastern Kentucky (Patton 2007); common in higher elevations (Palmer-Ball, Jr. 1996), but declining or extirpated in other areas of West Virginia (Wilson *et al.* 2007).

This species has been recorded in Maryland (Confer *et al.* 2011); it is virtually extirpated in Ohio (Peterjohn 1989b, Vallender 2009); found northeast into Pennsylvania where it is locally common; there are a few pairs in eastern New Jersey (Petzinger 2009). The Golden-winged Warbler is sparsely distributed throughout New York State (Andrle and Carroll 1998), with the highest concentrations found in the St. Lawrence River Valley and Hudson Highlands (Confer 2008); there are remnant populations found in Vermont (Clark 1985a), Massachusetts, and Connecticut (Swarthout *et al.* 2009). Most of these breeders are part of a disjunct, northern population that extends from southeastern Quebec along the St. Lawrence River Valley (Godfrey 1986), the Ontario border (Peck and James 1987), and the United States border with New York and Vermont (Confer 1988c) westward into Ontario near the southern Great Lakes (Godfrey 1986, Confer *et al.* 2011). The Golden-winged Warbler is a more common species in central and northern Michigan (Brewer *et al.* 1991, McPeck 1994c), central and northern Wisconsin (Cutright *et al.* 1996) and central Minnesota (Janssen 1987), with an expanding population in Manitoba (Cumming 1998, Artuso *et al.* 2008) with a few individuals in Saskatchewan (Godfrey 1986, Dunn and Garrett 1997).

The Golden-winged Warbler nests in habitat with dense herbaceous cover and patches of shrubs, often adjacent to a forest edge, and in the Appalachian region usually at moderate elevations (Klaus and Buehler 2001). Natural disturbance habitats include beaver glades, openings from natural fires, oak parklands, and swamp forests with partially open canopy (Confer *et al.* 2011). It also occurs in a variety of anthropogenic disturbance sites such as clear-

cuts, abandoned farmlands, reclaimed strip mines, and power line rights-of-ways (Confer *et al.* 2011).

The Golden-winged Warbler is a species in trouble in overall population due to habitat loss and hybridization with its close relative the Blue-winged Warbler (Confer *et al.* 2011). The Golden-winged and Blue-winged warblers interbreed and produce fertile hybrid offspring. Hybrid forms were first believed to be two separate species (Brewster's Warbler and Lawrence's Warbler), but were later understood to carry the dominant and recessive traits of the two parental species (Confer *et al.* 2011). Early work on hybridization compared species recognition capabilities of Golden-winged and Blue-winged Warblers in sympatric and allopatric populations (Ficken and Ficken 1968a, Ficken and Ficken 1968b, Ficken and Ficken 1968c, Ficken and Ficken 1968d, Ficken and Ficken 1969, Ficken and Ficken 1970, Ficken and Ficken 1973, Gill and Murray 1972a, Gill and Murray 1972b). DNA analyses show a 3.0% to 4.5% mitochondrial sequence divergence, which suggests the two species became isolated several million years ago (Gill 1987, Gill 1997, Shapiro *et al.* 2004, Dabrowski *et al.* 2005, Vallender *et al.* 2007b, Vallender *et al.* 2009b). Inexplicably, there is little differentiation in nuclear DNA between the two species (Vallender *et al.* 2007b), which suggests recent isolation.

The Golden-winged Warbler increased in abundance and expanded its distribution into New England more than a century ago and has continued to expand to the north and northwest in the north-central states and adjacent Canada during the last 100 years, yet it is declining in many areas and has disappeared from previously occupied regions (Confer *et al.* 2003, Buehler *et al.* 2007). Local declines correlate with both loss of habitat owing to succession and reforestation and with expansion of the Blue-winged Warbler into the range of the Golden-winged Warbler (Dunn and Garrett 1997, Confer *et al.* 2011). The loss of winter habitat in Central and South America and migratory habitat may also contribute to the Golden-winged Warbler's decline (Confer *et al.* 2011).

The Golden-winged Warbler is a migratory species that winters in southern Central America and northern South America, including central Guatemala and northern Honduras southward to northern and western Venezuela and western Columbia, where it is generally more abundant on the Caribbean side (Keast 1980, Rappole *et al.* 1983, Ridgely and Tudor 1989). A recent compilation of sightings, specimens, and banding records from Central and South America suggests the wintering range is more restricted than previously thought, with most records originating from Nicaragua, Costa Rica, Panama, Columbia, and Venezuela (Ridgely and Gwynne 1989). Records north from Nicaragua and in the Caribbean are suspected to be birds in passage (Confer *et al.* 2011).

The Golden-winged Warbler is a Trans-Gulf migrant that moves across Eastern North America, with birds moving further west in the Spring than in the fall (Dunn and Garrett 1997, Hamilton *et al.* 2007). Spring migration for the Golden-winged Warbler occurs from early April to early mid-May (Confer *et al.* 2011). In Texas, birds arrive in early April to early May, with documented extreme dates of March 10 and May 30; and this species is a fairly common migrant in spring along the coast (Oberholser 1974). In Kentucky, the first males arrive around April 20-25 with most males on site by 1 May (Confer *et al.* 2011). In West Virginia, the first males arrive from April 19-26 with peak arrivals occurring from April 23-27 (Confer *et al.* 2011) to May 3 (Confer *et al.* 2011). Further north, the Golden-winged Warbler arrives a little later in May. In southern Wisconsin, the peak arrival of this species occurs from May 10-20; in northern Wisconsin, the dates are from May 15-25 (Robbins 1991). In southern Michigan, peak arrival of the Golden-winged Warbler occurs in the first week of May (Will 1986). In general, the males tend to arrive several days before the females (Ficken and Ficken 1968a, Will 1986).

In eastern United States the peak fall movement of this species occurs in September (Dunn and Garrett 1997). The Golden-winged Warbler does not linger in the higher latitudes during southward movements; extreme late dates for several eastern states are from early to mid-October (Confer *et al.* 2011). Peak fall numbers in Florida occur from 11 September to 10 October, but especially in late September (Stevenson and Anderson 1994).

The Golden-winged Warbler is a rare, but regular fall migrant to the Maritimes, and is a casual spring and fall migrant to Newfoundland and Labrador and has occurred as an accidental migrant in Greenland (fall 1966) (Dunn and Garrett 1997).

There is an incredible record of a wintering male Golden-winged Warbler well photographed from Kent, in Great Britain January 24 to April 10, 1989 (Lewington *et al.* 1992).

Vagrants have also been recorded in the Virgin Islands, Trinidad, and Ecuador (Hamilton *et al.* 2007).

The Golden-winged Warbler is an accidental migrant in Alberta with 2 accepted records by the Alberta Bird Records Committee. The first was of an adult bird found at Porcupine Hills, on June 10, 1994 (Slater 2001) and the second was found at Police Point Park in Medicine Hat, on September 28, 1985 (Slater and Hudon 2002).

Along the West Coast of North America, the Golden-winged Warbler is a casual to accidental migrant. There are 78 accepted records for California by the California Bird Records Committee (Hamilton *et al.* 2007, Tietz and McCaskie 2018). The pattern of vagrancy mirrors the Blue-

winged Warbler, with a spike of records in late May and June, and during the months of September and October (Hamilton *et al.* 2007, Tietz and McCaskie 2018). Vagrants have also been recorded on the Baja California Peninsula and on Clipperton Atoll (Hamilton *et al.* 2007). The Golden-winged Warbler is an accidental migrant in Oregon with 2 accepted records by the Oregon Bird Records Committee. The first was found at Indian Ford Campground, in Deschutes County, June 14, 1977 (OFO 2016). The second was a singing male that was well documented at the Malheur National Wildlife Refuge, in Harney County, June 3-4, 1983 (OFO 2016).

The Golden-winged Warbler is an accidental vagrant in Washington State with 2 accepted records by the Washington Bird Records Committee. The first was a photographed immature female at the Turnbull National Wildlife Refuge, in Spokane County, on August 20, 1998 (WBRC 2018). The second state record was a photographed male found at Bainbridge Island, in Kitsap County, from September 12-13, 2003 (WBRC 2018).

The Golden-winged Warbler is a recent addition to the avifauna of British Columbia with a photographed bird found in the summer of 2018 in the Cariboo (Toochin *et al.* 2018).

There are no accepted records of the Golden-winged Warbler for Alaska (Gibson *et al.* 2019).

Identification and Similar Species

The identification of the Golden-winged Warbler is covered in all standard North American field guides. This is a smaller sized warbler measuring 12 cm in length, with a wingspan of 19 cm, and weighing 8.8 grams (Sibley 2000, Dunn and Alderfer 2011). This species is incredibly distinct-looking at any age, but confusion is possible with birds that are hybrids with Blue-winged Warbler (Dunn and Garrett 1997).

Adult males are dark to medium neutral gray above and white below, often a slight wash of trogon to buff-yellow on nape, back and undersides (Sibley 2000). The forehead is bright yellow (Curson *et al.* 1994). On the face is a black eye patch and large throat patch separated by white malar region (Dunn and Alderfer 2011). The greater and median upperwing coverts form a bright yellow wing patch (Curson *et al.* 1994). The primaries and feathers of the back and nape may be tipped with yellow (Curson *et al.* 1994). The tail is relatively short in length and gray (Sibley 2000). The outer three rectrices have a white patch on the inner web, with the largest on the outermost feather; patches sometimes displayed by aggressive, territorial males (Curson *et al.* 1994). The legs and feet are black (Dunn and Garrett 1997).

The adult female is similar to the male in overall colour and pattern, but has a considerably duller plumage (Dunn and Garrett 1997). The eye and throat patch are a pale neutral gray (Curson *et al.* 1994). The warm buff colour of the forehead and wing patch is much duller than is found on male birds (Dunn and Garrett 1997). The wing patch is small and often partially separated into two wing bars (Curson *et al.* 1994). There is a yellow ochre tint found on the nape and the back (Confer *et al.* 2011).

Juvenile birds hold their plumage from the months of June-August (Confer *et al.* 2011). The upperparts are grayish or brownish olive-green (Confer *et al.* 2011). The wings and tail are gray edged chiefly with a bluish plumbeous gray colour (Curson *et al.* 1994). The coverts and tertials are washed with an olive-green colour (Curson *et al.* 1994). There is a dusky transocular streak on the face. The underparts are pale olive-yellow with a dusky throat (Confer *et al.* 2011).

The song of the Golden-winged Warbler is a very fine, high buzzy “*zee zaa-zaa-zaa*” with the first note higher than the following notes (Sibley 2000). All notes are higher in pitch than the Blue-winged Warbler, but the Golden-winged Warbler can give variations in its song that overlap with that of the Blue-winged Warbler (Sibley 2000). Call note is a sharp chip or “*tsik*” which is similar to that of Blue-winged Warbler (Dunn and Garrett 1997). The flight note is a buzzy “*tzii*” which is indistinguishable from that given by the Blue-winged Warbler (Dunn and Garrett 1997).

Golden-winged Warbler freely hybridizes with Blue-winged Warblers creating birds that were once classified as species; Brewster's Warbler and Lawrence's Warbler which are identifiable and distinguishable from pure birds (Curson *et al.* 1994, Dunn and Garrett 1997). Brewster's Warbler is generally gray above and white below like Golden-winged Warbler (Confer *et al.* 2011). Brewster's Warbler lacks the distinctive Golden-winged Warbler head pattern (black auriculars and throat patch), but has a Blue-winged-like thin, black eye-line (Confer *et al.* 2011). Brewster's Warbler can have large amounts of yellow on the upper and lower body parts (Curson *et al.* 1994, Dunn and Garrett 1997). The female Brewster's Warbler is paler; the chest and abdomen may have more neutral gray than on the males (Confer *et al.* 2011, Dunn and Garrett 1997). The pale buff-yellow may be widely diffused throughout the body plumage (Sibley 2000, Dunn and Garrett 1997).

The Lawrence's Warbler generally looks like a Blue-winged Warbler with the addition of the Golden-winged Warbler facial and throat pattern (Sibley 2000, Dunn and Garrett 1997). Lawrence's Warbler is yellowish olive-green to citrine above and bright yellow below (Dunn and Garrett 1997, Dunn and Alderfer 2011). The wing bars are nearly or completely separate, and are a pale yellow to white (Confer *et al.* 2011, Dunn and Garrett 1997). For detailed analysis on

the hybridization of Golden-winged Warbler and Blue-winged Warbler please read Parkes (1951), Short (1969), Ficken and Ficken 1966, Ficken and Ficken (1970), Gill (1980), Confer (1988b), Will (1986), and Pyle (1997).

The Golden-winged Warbler is a distinctive species, and unlikely to be confused with any other regularly occurring warblers in British Columbia. The most complicated identification challenge is distinguishing 'pure' Golden-winged Warblers from the various hybrid forms of Blue-winged Warbler. Fortunately in the context of British Columbia, hybrids are just as rare as pure birds and with good views and photographs, such an identification issue should be relatively straightforward to resolve. Pure Golden-winged Warbler males have clean white underparts and bold, distinctive head patterns (Confer *et al.* 2011). It is important to note that some pure female Golden-winged Warblers can show hints of yellow below, making them even harder to distinguish from potential back-crosses (Confer *et al.* 2011). When seen from below, the head pattern of male Golden-winged Warbler is similar to that shown by Black-throated Gray Warbler (*Dendroica nigrescens*), but note that species' has dark-streaked flanks, different call notes and song (Sibley 2000, Dunn and Alderfer 2011). In some cases there can be confusion with chickadees given they have a similar head pattern and active foraging style, but the two are easily distinguished with reasonable views (Confer *et al.* 2011).

Occurrence and Documentation

The Golden-winged Warbler is an accidental vagrant in British Columbia. The first record was a videotaped adult male found by Dwaine Laxdal in his backyard at 807 Norn Rd., Quesnel on June 24, 2018 (D. Cecile Pers. Comm.). Images and video can be viewed on the BC Bird Alert Blog here <http://bcbirdalert.blogspot.com/2018/06/rba-golden-winged-warbler-in-quesnel.html>. The timing of this record fits perfectly with when southeastern warblers turn up in the west and with many of the records that have occurred along the West Coast. In California, the most probable vagrancy window is from mid-to-late May into late June, with 27 records out of 78 total records for the state (Hamilton *et al.* 2007, Tietz and McCaskie 2018). The highest cluster of records has been documented from May 20 – June 5 (Hamilton *et al.* 2007, Tietz and McCaskie 2018).

In the fall, the month of September has 18 records out of 78 state records, with the larger concentration of observations occurring in the latter half of the month (Hamilton *et al.* 2007, Tietz and McCaskie 2018). The other month that has a high number of records is October with 20 records that are concentrated more towards the latter half of the month (Hamilton *et al.* 2007, Tietz and McCaskie 2018).

This species should be watched for in established passerine vagrant traps and banding stations during the spring and fall migration periods. Though a long shot, other southeastern warblers have turned up as vagrants in British Columbia including; Hooded Warbler, Nothorn Parula, Prairie Warbler, Yellow-throated Warbler, and Blue-winged Warbler. This species could turn up practically anywhere in British Columbia, but the areas on the West Coast of Vancouver Island, lakeshore areas in the interior where valleys naturally narrow concentrating migrant passerines would be good places to check for this elusive gem. It is likely that this species will occur in the province again in the future.

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References

- Andrle, R. F. and J. R. Carroll. 1998. The atlas of breeding birds in New York state. Ithaca, NY: Cornell Univ. Press.
- Artuso, C., S. Van Wilgenberg and W. Vanderschuit. 2008. Bird Studies Canada: Golden-winged Warbler. [Online Resource] Retrieved from <http://www.birdscanada.org/research/speciesatrisk/gwwa>. [Accessed" December 12, 2018].
- Buehler, D. A., A. M. Roth, R. Vallender, T. C. Will, J. L. Confer, R. A. Canterbury, S. B. Swarthout, K. V. Rosenberg and L. P. Bulluck. 2007. Status and conservation priorities of Golden-winged Warbler (*Vermivora chrysoptera*) in North America. *Auk* 124(4): 1-7.
- Bulluck, L. P. 2007. Golden-winged Warbler (*Vermivora chrysoptera*) demographics and habitat use and the potential effects of land use change on Golden-winged and Cerulean Warblers (*Dendroica cerulea*) in the Cumberland Mountains of Tennessee. Thesis, Univ. of Tennessee, Knoxville.
- Bulluck, L. P. and D. A. Buehler. 2008. Factors influencing Golden-winged Warbler (*Vermivora chrysoptera*) nest-site selection and nest survival in the Cumberland mountains of Tennessee. *Auk* 125(3): 551-559.
- Clark, D. B. 1985a. "Golden-winged Warbler." In *The Atlas of Breeding Birds of Vermont.*, edited by S. B. Laughlin and D. P. Kibbe, 276-277. Hanover, NH: Univ. Press of New England.
- Confer, J. L. 1988b. "Blue-winged x Golden-winged warbler hybrids." In *The Atlas of Breeding Birds in New York state.*, edited by R. F. Andrle and J. R. Carroll, 358-361. Ithaca, NY: Cornell Univ. Press.

- Confer, J. L. 1988c. "Golden-winged Warbler *Vermivora chrysoptera*." In The atlas of breeding birds in New York State, edited by R. F. Andrie and J. R. Carroll. Ithaca, NY: Cornell Univ. Press.
- Confer, J. L. 2008. "Golden-winged Warbler (*Vermivora chrysoptera*)." In The atlas of breeding bird in New York State, edited by R. F. Andrie and J. R. Carroll, 468-469. Ithaca, NY: Cornell University Press.
- Confer, J. L., P. Hartman, and A. Roth. 2011. Golden-winged Warbler (*Vermivora chrysoptera*), version 2.0. In The Birds of North America (A. F. Poole, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA. [Online Resource] Retrieved from: <https://doi.org/10.2173/bna.20> [Accessed: July 22, 2018].
- Cumming, E. E. 1998. Distribution and habitat associations of Golden-winged Warblers in Duck Mt., Riding Mt., and Porcupine Hills, Manitoba. Report prepared for Canadian Wildlife Service, Forest Bird Research Division.
- Curson, J., Quinn, D., and Beadle, D. 1994. Warblers of the Americas. Houghton Mifflin Company, New York. 252pp.
- Cutright, N. J., B. R. Harriman and R. W. Howe. 2006. Atlas of the breeding birds of Wisconsin. Waukesha, WI: Wisconsin Society of Ornithology.
- Dabrowski, A., R. Fraser, J. L. Confer and I. J. Lovette. 2005. Geographic variability in mitochondrial introgression among hybridizing populations of Golden-winged (*Vermivora chrysoptera*) and Blue-winged (*V. pinus*) Warblers. Conservation Genetics 6 (5): 843-853.
- Dunn, J. L. and J. Alderfer. 2011. National Geographic Field Guide to the Birds of North America. National Geographic Society, Washington D.C. 574pp.
- Dunn, J. and K. J. Garrett, 1997. The Petersen Field Guide Series: A Field Guide to Warblers of North America. Houghton Mifflin Company, New York. 656pp.
- Ficken, M. S. and R. W. Ficken. 1966. Singing behaviour of Blue-winged and Golden-winged warblers and their hybrids. Behaviour 28: 149-181.
- Ficken, M. S. and R. W. Ficken. 1968a. Courtship of Blue-winged Warblers, Golden-winged Warblers and their hybrids. Wilson Bulletin 80: 161-172.
- Ficken, M. S. and R. W. Ficken. 1968b. Ecology of Blue-winged Warblers, Golden-winged Warblers and some other *Vermivora*. Am. Mid. Nat. 79: 311-319.

- Ficken, M. S. and R. W. Ficken. 1968c. Reproductive isolating mechanisms in the Blue-winged Warbler-Golden-winged Warbler complex. *Evolution* 22: 166-179.
- Ficken, M. S. and R. W. Ficken. 1968d. Territorial relationships of Blue-winged Warblers, Golden-winged Warblers and their hybrids. *Wilson Bulletin* 80: 442-451.
- Ficken, M. S. and R. W. Ficken. 1969. Responses of Blue-winged Warblers and Golden-winged Warblers to their own and the other species' song. *Wilson Bulletin* 81: 69-74.
- Ficken, M. S. and R. W. Ficken. 1970. Comments on introgression and reproductive isolating mechanisms in the Blue-winged Warbler-Golden-winged Warbler complex. *Evolution* 24: 254-256.
- Ficken, M. S. and R. W. Ficken. 1973. Effect of number, kind and order of song elements on playback responses of Golden-winged Warbler. *Behaviour* 46: 114-128.
- Gill, F. B. 1980. Historical aspects of hybridization between Blue-winged and Golden-winged warblers. *Auk* 97: 1-18.
- Gill, F. B. 1987. Allozymes and genetic similarity of Blue-winged and Golden-winged warblers. *Auk* 104: 444-449.
- Gill, F. B. and Jr. Murray, B. G. 1972a. Discrimination behavior and hybridization of the Blue-winged and Golden-winged warblers. *Evolution* 26: 282-293.
- Gill, F. B. and Jr. Murray, B. G. 1972b. Song variation in sympatric Blue-winged and Golden-winged warblers. *Auk* 89: 625-643.
- Godfrey, W. E. 1986. *The Birds of Canada*. Revised Edition. National Museums of Canada, Ottawa, ON, Canada.
- Gibson, D.D, L. H. DeCicco, R. E. Gill Jr., S. C. Heinl, A. J. Lang, T. G. Tobish Jr., and J. J. Withrow. 2017. Checklist of Alaska Birds. 25th Edition: 2019. [Online Resource] Retrieved from <http://www.universityofalaskamuseumbirds.org/products/checklist.pdf> [Accessed: January 23, 2019].
- Hamilton, R. A., M. A. Patten, and R. A. Erickson. 2007. *Rare Birds of California: A work of the California rare bird record committee*. Western Field Ornithologists, Camarillo, California. 605pp.
- Janssen, R. B. 1987. *Birds in Minnesota*. University of Minnesota Press, Minneapolis, MN, USA.

- Keast, A. 1980. "Spatial relationships between migratory parulid warblers and their ecological counterparts in the Neotropics." In *Migrant birds in the Neotropics: ecology, behaviour, distribution, and conservation.*, edited by A. Keast and E. S. Morton, 109-132. Washington, D.C: Smithson. Inst. Press.
- Klaus, N. A. 2004a. Status of the Golden-winged Warbler in North Georgia, and a nesting record of the Lawrence's Warbler. *Oriole* 69: 1-7.
- Klaus, N. A. 2010b. "Golden-winged Warbler (*Vermivora chrysoptera*)." In Athens, GA, edited by T. M. Schneider, G. Beaton, T. S. Keyes and N. A. Klaus, 322-323. Univ. of Georgia Press.
- Klaus, N. A. and D. A. Buehler. 2001. Golden-winged Warbler breeding habitat characteristics and nest success in clearcuts in the southern Appalachian mountains. *Wilson Bulletin* 113(3): 297-301.
- Lewington, I., P. Alström, and P. Colston. 1992. *A Field Guide to the Rare Birds of Britain and Europe*. Jersey: Domino Books Ltd., Jersey, UK. 448pp.
- McPeck, G. A. 1994c. "Golden-winged Warbler." In *The Birds of Michigan*, edited by J. Granlund, G. A. McPeck, R. J. Adams and G. van Frankenhuisen, 242-243. Bloomington,
- Oberholser, H. C. 1974. *The Bird Life of Texas*. University of Texas Press, Austin, TX, USA.
- OFO. 2016. Oregon Field Ornithologists - Records Committee. [Online resource] <http://www.oregonbirds.org/index.html>. [Accessed: December 24, 2018].
- Palmer-Ball, B.L., Jr. 1996. *The Kentucky Breeding Bird Atlas*. Lexington: University Press of Kentucky.
- Parkes, K. C. 1951. The genetics of the Golden-winged and Blue-winged warbler complex. *Wilson Bulletin* 63: 5-15.
- Patton, L. L. 2007. Comparative ecology of Golden-winged Warbler and Blue-winged Warbler on reclaimed surface mines in Kentucky. Thesis, Univ. of Kentucky, Lexington.
- Peck, G. K. and R. D. James. 1987. *Breeding birds of Ontario: Nidology and distribution*. Vol. 2. Passerines. Toronto: Misc. Publ. Roy. Ont. Mus.
- Peterjohn, B. G. 1989b. *The birds of Ohio*. Bloomington: Indiana Univ. Press.
- Pyle, P. 1997. *Identification Guide to North American Birds Part I: Columbidae to Ploceidae*. Slate Creek Press, Bolinas, CA, USA.

- Rappole, J. H., E. S. Morton, T. E. Lovejoy III and J. S. Rous. 1983. Nearctic avian migrants in the neotropics. Washington, D.C: U.S. Fish and Wildl. Serv.
- Ridgely, R. S., and J. Gwynne 1989. A Guide to the Birds of Panama, with Costa Rica, Nicaragua, and Honduras. 2nd edition. Princeton University Press, Princeton, NJ, USA.
- Ridgely, R. S. and G. Tudor. 1989. The birds of South America, Vol. 1: the oscine passerines. Austin: Univ. of Texas Press.
- Robbins, S. D., Jr. 1991. Wisconsin Birdlife: Population and Distribution, Past and Present. University of Wisconsin Press, Madison, WI, USA.
- Shapiro, L. H., R. A. Canterbury, D. M. Stover and R. C. Fleischer. 2004. Reciprocal introgression between Golden-Winged Warblers (*Vermivora chrysoptera*) and Blue-Winged Warblers (*V. pinus*) in eastern North America. *Auk* 121(4): 1019-1030.
- Short, L. L. 1969b. Taxonomic aspects of avian hybridization. *Auk* 86: 84-105.
- Sibley, D. A. 2000. The Sibley field guide to birds. Alfred A. Knopf, New York. 545pp.
- Slater, A. 2001. The Third Report of the Alberta Bird Record Committee. *Alberta Naturalist* 31(1): 5.
- Slater, A. and J. Hudon. 2002. Fourth Report of the Alberta Bird Record Committee. *Alberta Naturalist* 32(3): 116.
- Stevenson, H. M., and B. H. Anderson. 1994. The Birdlife of Florida. University Press of Florida, Gainesville, FL, USA.
- Swarthout, S., K. V. Rosenberg, R. W. Rohrbaugh and R. S. Hames. 2009. Golden-winged Warbler Atlas Project. Final Technical Report submitted to US Fish and Wildlife Service.
- Tietz, J. and G. McCaskie. 2018. Update to Rare Birds of California: 1 January 2004 – 23 January 2018. [Online Resource] Retrieved from http://www.californiabirds.org/cbrc_book/update.pdf [Accessed: July 22, 2018].
- Toochin, R., J. Fenneman, P. Levesque and D. Cecile. 2018. British Columbia Rare Bird List: Casual and Accidental Records: July 15, 2018: 5th Edition [Online Resource] Retrieved from <http://ibis.geog.ubc.ca/biodiversity/efauna/documents/BC%20Rare%20Bird%20ListVersion-July-15-2018.pdf> [Accessed: January 27, 2019].

- Vallender, R. 2009. "Golden-winged Warbler." In Atlas of the Breeding Birds of Ohio, 2001-2005, edited by M. D. Cadman, D. A. Sutherland, G. G. Beck, D. Lepage and A. R. Couturier, 462-463. Toronto, Ontario: Bird Studies Canada.
- Vallender, R., R. J. Robertson, V. L. Friesen and I. J. Lovette. 2007b. Complex hybridization dynamics between Golden-winged and Blue-winged Warblers (*Vermivora chrysoptera* and *Vermivora pinus*) revealed by AFLP, microsatellite, intron and mtDNA markers. *Molecular Ecology* 16(10): 2017-2029.
- Vallender, R., S. L. Van Wilgenburg, L. P. Bulluck, A. M. Roth, R. A. Canterbury, J. L. Larkin, R. M. Fowlds and I. J. Lovette. 2009b. Extensive rangewide mitochondrial introgression indicates substantial cryptic hybridization in the Golden-winged Warbler (*Vermivora chrysoptera*). *Avian Conservation and Ecology* 4: 4.
- Will, T. C. 1986. The behavioral ecology of species replacement: Blue-winged and Golden-winged warblers in Michigan. Ph. D. diss., Univ. Michigan, Ann Arbor.
- Wilson, M. D., B. D. Watts, M. G. Smith, J. P. Bredlau and L. W. Seal. 2007. Status assessment of Golden-winged Warblers and Bewick's Wrens in Virginia. Willaimsburg, Virginia: Center for Conservation Biology, College of William and Mary.
- WBRC. 2018. Washington Bird Records Committee – Summary of Decisions. Washington Ornithological Society, Seattle, WA. [Online resource]
<http://www.wos.org/wbrcaccepteddec2018.pdf> [Accessed: December 16, 2018].