

# Probable Yellow-bellied Sapsucker (*Sphyrapicus varius*) × Red-breasted Sapsucker (*S. ruber*) hybrid from eastern Kansas, with comments on the field identification of adult sapsuckers

## Abstract

A sapsucker (*Sphyrapicus*) found 15 December 2001 near Lawrence, Kansas was collected and studied through molecular methods (mitochondrial DNA sequencing and allozyme analysis), consultation with researchers working on hybridization of sapsuckers, and analysis of 201 adult male specimens of Red-naped (*S. nuchalis*) and Yellow-bellied (*S. varius*) Sapsuckers. We conclude that the individual sapsucker in question is not a Red-naped Sapsucker as originally identified in the field but rather a hybrid, most likely the result of a pairing of a female Yellow-bellied with a male Red-breasted Sapsucker (*S. ruber*), thus potentially the first specimen of this hybrid combination away from the very limited contact zone of these species in British Columbia. We offer comments on pitfalls in the identification of sapsuckers by plumage, as well as an overview of reports of similar sapsuckers in eastern North America, especially the Great Plains region, where unusually plumaged sapsuckers have occasioned debates for over a decade.

## Field Encounter

On 15 December 2001, Seibel discovered a sapsucker with unusual plumage on the Lawrence, Kansas Christmas Bird Count near Lawrence. This individual was initially identified as an adult male Red-naped Sapsucker (*Sphyrapicus nuchalis*) because of the presence of an extensive red nape and the complete incursion of red in the black malar (Figure 1). However, Seibel and others recognized that the bird was atypical for an adult male Red-naped because of extensive red suffusion on the broad black chest band. When Robbins was shown photographs of the bird, he recognized that the back pattern (Figure 2) was typical of an adult Yellow-bellied (*S. varius*). Furthermore, his past examination of adult male sapsucker specimens (see below) had shown the presence of extensive red on the nape to be an unreliable character for separating these two sapsucker species. Knowing that genetic studies had been done on sapsuckers (Johnson and Zink 1983, Cicero and Johnson

1995), both before and after the recognition of these sapsuckers as separate species (AOU 1985), Robbins collected the bird on 20 December 2001 (KUNHM 92332; Figure 3) and preserved tissue for analysis by Cicero.

## Age, Sex, Plumage, and Genetics of the Lawrence bird

Upon dissection, the bird surprisingly proved to be an adult female with a granular ovary mass  $3.5 \times 2$  mm. Internally, the size and shape of the gonads coupled with the absence of the bursa of Fabricius indicated that the bird was at least a year and a half old. The uniformly dark and fresh primary coverts, the uniformly adult secondaries, and the uniformly adult flight feathers indicate that the bird was at least four calendar years old (Pyle 1997). In addition to having a typical Yellow-bellied back and ventral pattern (i.e., intensive yellow underparts), it also had the outermost two pairs of rectrices (numbers 4 and 5) heavily mottled and tipped with white (intermediate between Figure 129A and Figure 129B in Pyle [1997]). Adult male Red-naped and Red-breasted Sapsuckers (*S. ruber*) have the outer rectrix mostly black, and adult female Red-naped and Red-breasted have less mottling than female Yellow-bellied, especially on rectrix four.

Mitochondrial (mtDNA) sequencing of a diagnostic 300 bp fragment of the mtDNA cytochrome-*b* (Cicero and Johnson 1995) identified the bird as a Yellow-bellied Sapsucker. This result was confirmed by additional sequencing of the entire cytochrome-*b* gene for the Lawrence bird and known individuals of *S. nuchalis* (MVZ 168594) and *S. varius* (MVZ 168650). However, because mtDNA is maternally inherited, the sequence data only confirmed that the maternal parent was *varius*.

In an attempt to identify both parents, Cicero also used allozymes following the work of Johnson and Zink (1983). Their study did not find fixed differences between any species of *Sphyrapicus* other than *S. thyroideus*, although there were notable fre-

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quency differences at purine nucleoside phosphorylase (NP) and aminopeptidase leucyl-glycyl-glycine (LGG). Cicero analyzed LGG for the Kansas sample, using the same two MVZ specimens for standards, and found the Kansas bird to be homozygous for the allele that occurs in higher frequency in *S. nuchalis* than *S. varius*. Attempts to score the same samples for the NP locus were ambiguous. A review of the raw allozyme data used in Johnson and Zink (1983) revealed that two of the eight *S. varius* that they examined likewise were homozygous for this allele; the other six birds were either het-





Figure 1. Adult female probable Yellow-bellied Sapsucker x Red-breasted Sapsucker, 16 December 2001, near Lawrence, Kansas. Note that the dark malar is mostly red and the red of the throat masks most of the black chest band. The prominent red nape is visible even in this profile. Photograph by Kyle Gerstner.

erozygotes or homozygous for a second allele. Therefore, the allozyme data for the Lawrence bird are not unexpected but unfortunately do not provide evidence to identify the paternal parent of this individual.

Although the genetic data indicate that the female parent was a Yellow-bellied, we are limited to an analysis of plumage to infer the identity of the male parent. There are two plausible hypotheses for the male-like plumage in this individual. It is conceivable that the abnormal amount of red on the throat and upper breast are the result of a genetic abnormality or an unknown aging phenomenon, perhaps related to reduced hormone levels (e.g., estrogen). Older females in some species may acquire male-like plumage, e.g., Summer Tanager (Pyle 1997, Owens and Short 1995). However, our discussions with J. Hudon and M. Gosselin, who examined photographs of the Lawrence specimen, and our examination of hybrids have led us to believe that the most likely explanation for the unusual degree of red in the Lawrence bird is a hybridization event between a female Yellow-bellied and a male Red-breasted Sapsucker.

As mentioned above, the Lawrence bird has back, rectrix, and facial patterns of a Yellow-bellied, whereas the extension of the red of the throat masking the black breast band is exhibited only in Red-breasted. Although the bright yellow underparts may simply be the result of Yellow-bellied genes, we note that the northern (nominate) subspecies of Red-breasted—unlike the southern subspecies (*S.*

*ruber daggetti*) and Red-naped Sapsucker—also shows a bright yellow belly. From a distributional standpoint, a hybrid event between Yellow-bellied and nominate Red-breasted is far more probable than a Yellow-bellied x *S. ruber daggetti* event (Campbell et al. 1990, A.O.U. 1998).

Because of the wide range in variation in hybrid phenotypes among all three of these sapsucker species (Howell 1952, Johnson and Johnson 1985, J. Hudon, M. Gosselin, pers. comm.), it is uncertain if the Lawrence individual is an F<sub>1</sub> or the result of a back-cross. Interestingly, except for the Yellow-bellied back pattern of the Lawrence bird, it is very similar to specimens of Red-naped Sapsucker x Red-breasted Sapsucker hybrids of both sexes, e.g., Canadian Museum of Nature, Ottawa specimens 47951 and 52385

(Devillers 1970, Johnson and Johnson 1985, M. Gosselin, pers. comm.).

## DISCUSSION

### Plumage characters and their relevance for identification

#### Nape

As mentioned above, the presence or absence of red in the nape is an unreliable character for separating Yellow-bellied and Red-naped Sapsuckers. Kaufman (1990) correctly pointed out that some Red-naped, especially worn individuals in late summer, lack red on the nape. In mid-July 2004, Robbins conducted field work in the South Dakota/Wyoming Black Hills and observed 14 adult Red-naped Sapsuckers (in which nape coloration was clearly visible) with the following distribution: one female with no red, two females and two males with only a hint of red, and five birds that had moderate to extensive red napes.

Kaufman (1990) also noted that some adult male Yellow-bellieds have red in the nape.

While reviewing a controversial Missouri report of a Red-naped in 1993 (see below), Robbins examined a total of 120 adult male Yellow-bellied Sapsucker and 81 adult male Red-naped Sapsucker museum specimens. Of the adult male Yellow-bellieds examined, 23 (19%) had red in the nape ranging from a few red feathers that would not be visible in the field to two individuals taken during migration near Philadelphia, Pennsylvania (ANSP 173632 and 173633) that had as much red in the nape as average fresh-plumaged, adult male Red-naped. Except for the red nape, the plumage of both of the latter two individuals appeared to be classic Yellow-bellieds. In Howell (1952), E. Godfrey related that a specimen from Megantic County, Québec, Canada had an extensive amount of red on the nape but showed no other Red-naped characters. A more recent Québec record of a breeding adult male Yellow-bellied with an extensive red nape was documented with a color photograph at Saint-Jacques de Leeds in 1988 (*American Birds* 42: 1225).

#### Malar

The coloration of the dark malar in adult male sapsuckers is a valuable character for identification. Adult male Red-naped usually have some encroachment of the red throat onto the malar. However, this can vary considerably, ranging from birds that have an all-



Figure 2. Dorsal view of the same Lawrence female depicted in Figure 1. The red nape is conspicuous and the malar, which is typically black in both sexes of Yellow-bellied and in female Red-naped, is heavily suffused with red. However, the typical Yellow-bellied back pattern—i.e., the extensive light-colored plumage in proportion to black, is apparent. Photograph by Kyle Gerstner.





**Figure 3.** Ventral view of Lawrence female (KUMNH 92332). Note that the red throat masks most of the black chest band. This feature is unknown in pure Yellow-bellied and Red-naped but is characteristic of Red-breasted. The bright yellow underparts are typical for Yellow-bellied and the nominate subspecies of Red-breasted. Photograph by Mark Robbins.

black malar to more extreme cases in which the black malar is nonexistent—i.e., the malar region is entirely red. Robbins observed five of seven adult male Red-naped during mid-July in the Black Hills that appeared to have all-black malars. Given that red pigmentation in sapsuckers is present only in the tips of feathers, this can be easily worn off, revealing the all-black remainder of the feathers. However, this should not be an identification concern outside the period from late June through August. Female Red-naped typically do not have any red in the black malar, and we are unaware of any Yellow-bellieds, with the exception of possible hybrids, having red in the black malar. Thus, if red is present in the malar and there is no unusual coloration elsewhere that might indicate a hybrid, it is reasonably safe to say that the bird is a Red-naped, and very likely a male.

#### Back

The character that seems to be the least variable in non-hybrid adults of all three of these sapsuckers is the proportion of black and light-colored areas in the back. Adult Yellow-bellieds invariably have more light-colored back plumage than do adult Red-naped and Red-breasted (both sexes of Red-breasted average more black than Red-naped). Adult female Red-naped have less black in the back than adult male Red-naped, and thus some females approach Yellow-bellieds in the amount of light-col-

ored area in the back, especially in mid- to late summer, when birds are heavily worn and may appear washed out (Robbins, pers. obs.). Nonetheless, female Red-naped still possess noticeably more black in the back than either sex of Yellow-bellied (Figure 3). Additionally, the reduced pale area in adult Red-naped is typically whiter than that of Yellow-bellieds; in the latter, this pale region is often washed with a light buffy-yellow. It should be noted that the pale dorsal region of nominate Red-breasted also is yellowish.

#### Throat

In addition to unusual individuals like the Lawrence sapsucker, sexing of adult Red-naped Sapsuckers can be problematic because of variability in the amount of red in female throats (Kaufman 1990, Pyle 1997, Shunk 2005, T. Leukering, pers. comm.). This variation runs the gamut from females with only a thin red area immediately above the broad, black chest patch to individuals that have entirely red throats. It is unknown if the amount of red on the throat is age-related or the result of hybridization. Female Red-naped showing an all-red throat and black malars would be extremely challenging to distinguish from adult male Yellow-bellieds. The only field characters that might distinguish them would be the extent of black on the back, coloration of the light area on the back, and potentially the coloration of the underparts.

#### Hybridization

It has been known for some time that the identification of a small percentage of adult Yellow-bellied, Red-naped, and Red-breasted Sapsuckers is problematic, both because of overlap in plumage characters among these species and because of hybridization among them. Kaufman (1990) underscored that some adult individuals of this complex cannot be identified under field conditions. Until recently, hybridization between Yellow-bellied and Red-naped Sapsuckers was thought to be “limited and localized” (Howell 1952, AOU 1998); however, unpublished details from western Alberta indicate that there is “extensive” hybridization (J. Hudon, pers. comm.; <[www.pma.edmonton.ab.ca/natural/birds/projects/results.htm](http://www.pma.edmonton.ab.ca/natural/birds/projects/results.htm)>; Shunk 2005). Further complicating identification are hybrids between Red-naped and Red-breasted along a narrow interface from central British Columbia south to the California–Nevada border (Howell 1952, Devillers 1970, Browning 1977, Johnson and Johnson 1985, Campbell et al. 1990, Hamilton and Dunn 2002, Shunk 2005). Presumed Red-naped × Red-breasted hybrids have been encountered during migration and winter as far east as Arizona and western Texas (Phillips et al. 1964, Lockwood and Shackelford 1998). In contrast, because of very limited contact in northern British Columbia, only a single potential hybrid specimen of Yellow-bellied and Red-breasted has been reported prior to the



Lawrence bird (Howell 1952, Campbell et al. 1990, Walters et al. 2002, M. Gosselin, pers. comm.). As Howell (1952) noted, the identification of a *varius* × *ruber* hybrid collected by H. S. Swarth at Telegraph Creek, northwestern British Columbia (MVZ 39781) was based more on the fact that it was well north of the *nuchalis/ruber* contact zone than on plumage characters. Indeed, our examination of the specimen indicates there are no obvious *varius* characters, and if it were not for the locality we would classify it as a *nuchalis* × *ruber* hybrid. Unlike the Lawrence presumed *varius* × *ruber* hybrid, the Telegraph Creek bird has a back pattern typical of *nuchalis* and *ruber*. Mixed *varius* × *ruber* pairs have, however, been documented through fieldwork in 1969 by W.E. Godfrey (summarized in Campbell et al. 1990) and in 1974 by Scott et al. (1976).

In addition to the examples above, we mention the following records to underscore the extent of unusual-appearing sapsuckers in central and eastern North America. A bird that was initially reported as an adult male Red-naped in April 1993 in Jackson County, Missouri was either a Yellow-bellied or a Yellow-bellied × Red-naped hybrid. Although this bird had an extensive red nape, quite similar to the Lawrence bird, it too had the classic back pattern of a Yellow-bellied, and the malar stripes were entirely black (color photographs in Missouri Bird Records Committee file #1993-33). A similar bird was photographed 12–19 February 1993 at Tishomingo National Wildlife Refuge, Johnston County, Oklahoma (Grzybowski [1993] includes black-and-white photograph; we also examined a color image). Another similar sapsucker was documented 26 February 2002 at Washington, Washington County, Kansas by Dan Thalmann. Both of these birds were presumed to be males and had red napes but otherwise appeared as typical Yellow-bellied. An adult sapsucker, of unknown sex, that appeared in Holmes County, Ohio 3–8 April 2005 (under review by the Ohio Bird Records Committee; Casey Tucker, pers. comm.) may have been a Yellow-bellied × Red-naped hybrid. The Ohio bird had a red nape and mostly red malars, but the ventral yellow wash was more typical of a Yellow-bellied and the back pattern appeared intermediate between these two taxa. In Appalachian North Carolina, John Gerwin observed a presumed adult male Yellow-bellied Sapsucker with a conspicuous red nape and inordinate “orange-yellow” patches, nearly forming a band, on the upper chest on 28 March 2004 in Moses Cone National Park, Watauga County. Except for the chest being orange-yellow instead of red, the North Carolina bird apparently was very similar to the Lawrence sapsucker. The bird was not collected or photographed; if it was indeed a male, one wonders whether it could have been a hybrid.

## Summary

Great care must be exercised in the identification of sapsuckers because of overlap in plumage characters and because of hybridization. The proportion of black vs. white on the back and the presence or absence of red in the dark malar in adult males are the most reliable plumage characters for separating Red-naped and Yellow-bellied Sapsuckers under field conditions. The presence of red in the nape should only be considered suggestive of Red-naped; the other two characters should be observed carefully in order to distinguish these species. Hybridization should be considered as a possibility for any sapsucker that has a combination of the above key characters and has an unusual amount of red in other regions of the head and chest. The sapsucker from eastern Kansas documented herein potentially represents the first specimen of Yellow-bellied Sapsucker × Red-breasted Sapsucker hybrid away from the very limited contact zone in British Columbia.

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