

## Uniquely Radiant Western Tanagers

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A few days ago I stood within a swirl of flashing color at Great Sand Dunes National Park. The Western Tanagers had returned.

The Western Tanager, *Piranga ludoviciana*, is a likely candidate for the most colorful bird in the Rocky Mountains. Males have scarlet on the face and top of the head which grades into bright yellow on the back of the head, neck, breast and belly. His back, tail and wings are black and his wings have one yellow and one white bar. The pale bill is stout and sharply pointed. The female wears subdued colors. Her face, head, neck, breast and belly are softer yellow, her back and wings are grey.

The Western Tanager is a migratory species that returns from its wintering grounds in Mexico and Central America in early May. Tanagers breed in open forests from southern Texas to the Northwest Territories.

Their preferred food is insects. They slowly and deliberately search branches and needles for prey and they harvest flying butterflies, beetles, dragonflies and flies in aerial sallies. They also take fruits and berries and I have watched them eating flowers on my cotoneaster hedge.

Comparisons of DNA sequences reveal that Western Tanagers are most closely related to Flame-colored Tanagers and then Hepatic Tanagers. Summer Tanagers and Scarlet Tanagers are also closely related. Hybridization of Western with both Flame-colored and Scarlet Tanagers has been reported.

Scarlet, Flame-colored, Hepatic and Summer Tanagers all use the same ancestral mixture of pigments to produce scarlet, but Western Tanagers produce the same color by very different means.

Tanagers obtain several carotenoid pigments in their diets and deposit them in feathers to produce bright yellow and grayish-green hues. They can metabolically modify the carotenoids to produce several keto-carotenoids, which are red pigments. When the carotenoids and keto-carotenoids are mixed in the correct proportions, they produce the brilliant scarlet common to the crown feathers of all male tanagers.

Western tanagers have lost the ability to metabolically produce keto-carotenoid pigments. Instead, they use rhodoxanthin, which is synthesized in the needles of spruces, firs, pines and junipers. Herbivorous insects feeding on needles ingest and accumulate rhodoxanthin and reluctantly yield it to Western Tanagers.

Western Tanagers store rhodoxanthin in their crown feathers along with the yellow pigments used by the other tanagers. This mixture of pigments is tweaked by the addition of phaemelanin, which adds a golden hue. Finally, the apparent color is adjusted by changing the angle of presentation of pigmented surfaces in crown feathers.



Why did Western Tanagers adopt a new pigment system and then modify other pigments and feathers to produce the same color? As the Tanagers colonized the coniferous forest, their environment presented a dietary source of red pigment. It is probably more energetically efficient to ingest red pigments than to synthesize them. However, females assess the attractiveness of males and they had an established preference for males with bright scarlet faces. They probably shunned males sporting new colors.

The unique pigment system of male western tanagers provides additional information to females shopping for mates. The brilliance of a male's face reflects his success at hunting insects. Western Tanagers display a red pigment synthesized in conifer needles. Insects eat the needles and are then eaten by Tanagers.

Photo by Jeff Mitton