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FLAVONOIDS OF *HETEROGAURA* (ONAGRACEAE)

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Key Word Index—*Heterogaura heterandra*; Onagraceae; Onagreae; flavonoid; flavonol; kaempferol; quercetin; myricetin; chemosystematics.

Abstract—*Heterogaura* is a monotypic genus of the tribe Onagreae of the Onagraceae. It is endemic to south western Oregon and California. Four flavonol glycosides, kaempferol 3-*O*-rhamnoside, quercetin 3-*O*-glucoside, quercetin 3-*O*-rhamnoglucoside and myricetin 3-*O*-glucoside, were found to occur in methanolic leaf extracts of each of the populations sampled. The presence of only flavonols is consistent with flavonoid analyses from other genera of the Onagreae, including *Clarkia*, the closest relative of *Heterogaura*.

INTRODUCTION

Heterogaura heterandra (Torr.) Cov., the single species of *Heterogaura*, is an annual herb endemic to south western Oregon and California, where it occurs from Siskiyou and Trinity counties scattered southwards in the mountains to Los Angeles and San Bernardino counties. As part of a comprehensive investigation of the flavonoids in Onagraceae, we report here on those of *Heterogaura*. This represents the first report on flavonoids in this genus.

RESULTS

Methanolic extracts from the leaves of three populations of *Heterogaura* yielded four flavonol 3-*O*-glucosides: kaempferol 3-*O*-rhamoside, quercetin 3-*O*-glucoside, quercetin 3-*O*-rhamnoglucoside (rutin), and myricetin 3-*O*-glucoside. All four compounds were found to be present in each of the three populations sampled.

DISCUSSION

Although flavonoid data for a number of species of *Oenothera* have been reported [1–4], relatively little is known for the other genera of the tribe Onagreae. Only one or a few species of the remaining genera have been examined and much of this is, as yet, unpublished work from our own laboratory. The type of compounds present in the tribe and the need for additional chemosystematic investigations have been reviewed elsewhere [5], but all flavonoids reported for the tribe have been flavonols as are the compounds reported here for *Heterogaura*. Of the related genera, we have unpublished data for five species of *Clarkia*, certainly the nearest relative of *Heterogaura*. The same four compounds found in *Heterogaura* are typically present in the few species of *Clarkia* that have been analysed, although additional compounds are found in some species of *Clarkia*.

EXPERIMENTAL

Plant material. Plants were obtained from three populations of *Heterogaura heterandra*. The material was air-dried and the leaves removed for extraction. Voucher specimens are deposited at the Missouri Botanical Garden. Eldorado Co., Smith & Stebbins 78112. Tulare Co., Raven 20238. Tulare Co., Raven 20240.

Isolation and identification. The leaf material was ground and extracted overnight with 85% MeOH and the resulting extract examined by 2D-PC. For structural elucidation, replicate chromatograms were run and the isolated compounds cut from the paper for further purification and analysis. The quantity of leaf material utilized varied but was *ca* 0.5–1 g for screening and *ca* 5–10 g for replicate chromatograms. Sufficient MeOH was added to just cover the ground leaf material. Identification of the glycosides and their aglycones was accomplished by standard spectroscopic, co-chromatographic, and hydrolytic techniques [6–9].

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