

Ecological Factors in the Hybridization of Iris tenax douglasiana
(Herbert) Clarkson and *Iris tenax innominata* (Henders.)
Clarkson¹

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THE PRESENT author has suggested (Clarkson, 1959) that *Iris tenax* Dougl. subsp. *thompsonii* (Foster) Clarkson is of hybrid origin and has advanced reasons for regarding that taxon as equal in rank with its proposed parental subspecies, *I. t. innominata* (Henders.) Clarkson, and *I. t. douglasiana* (Herbert) Clarkson. Lenz (1958) also considered the individuals referred to *I. thompsonii* by Foster (1937) to be of hybrid origin but retained them within *I. innominata* Henders. Lenz also retained *I. douglasiana* Herb. in specific rank. However, regardless of taxonomic status, considerable evolutionary significance can be established by an examination of the ecological factors influencing both the hybridization and the subsequent selection and distribution of those hybrid offspring referred by Foster to *I. thompsonii*.

In this paper, the parental forms and their hybrid derivative will be treated as subspecies as by Clarkson (1959). Distinguishing characteristics of all three have been discussed in the papers cited above and are not repeated here. Ecological information concerning Oregon and extreme northern California only is presented, although *I. t. douglasiana* is widespread throughout coastal California.

Data were gathered at a number of sites following, in general, the methods suggested by Daubenmire (1959). Figure 1 shows general distributions; Tables 1, 2, and 3 provide a summary of the salient ecological features of each of the subspecies; and Figure 2 provides a comparison of all three in regard to certain critical environmental features. Study sites for *I. t. innominata* and *I. t. douglasiana* were selected mainly in and near hybridization zones although additional areas were studied in order to determine possible variation. *I. t. thompsonii* was studied over as wide a range as possible. General observations indicate that the sites listed in the tables are typical.

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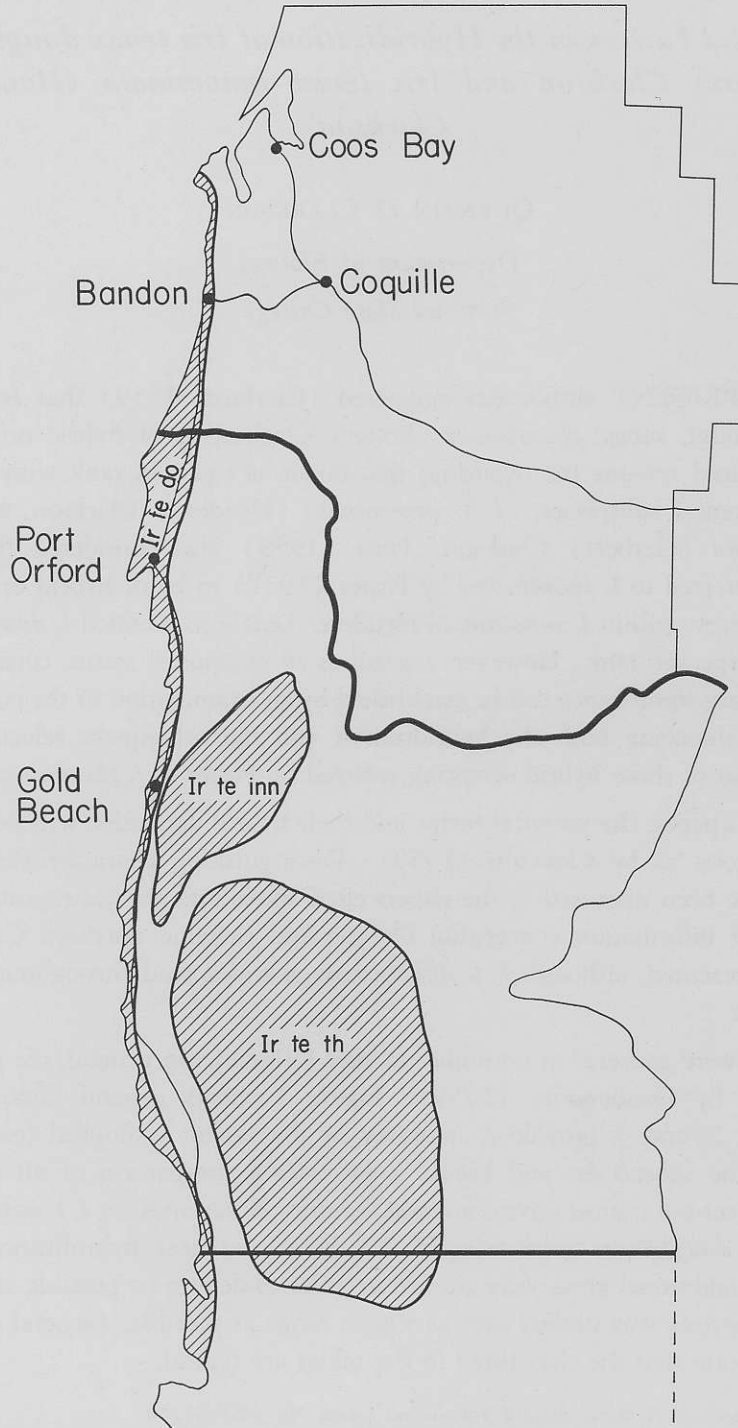


Figure 1. General distribution of *Iris tenax douglasiana*, *I. t. innominata* and *I. t. thompsonii* in Oregon and northern California.

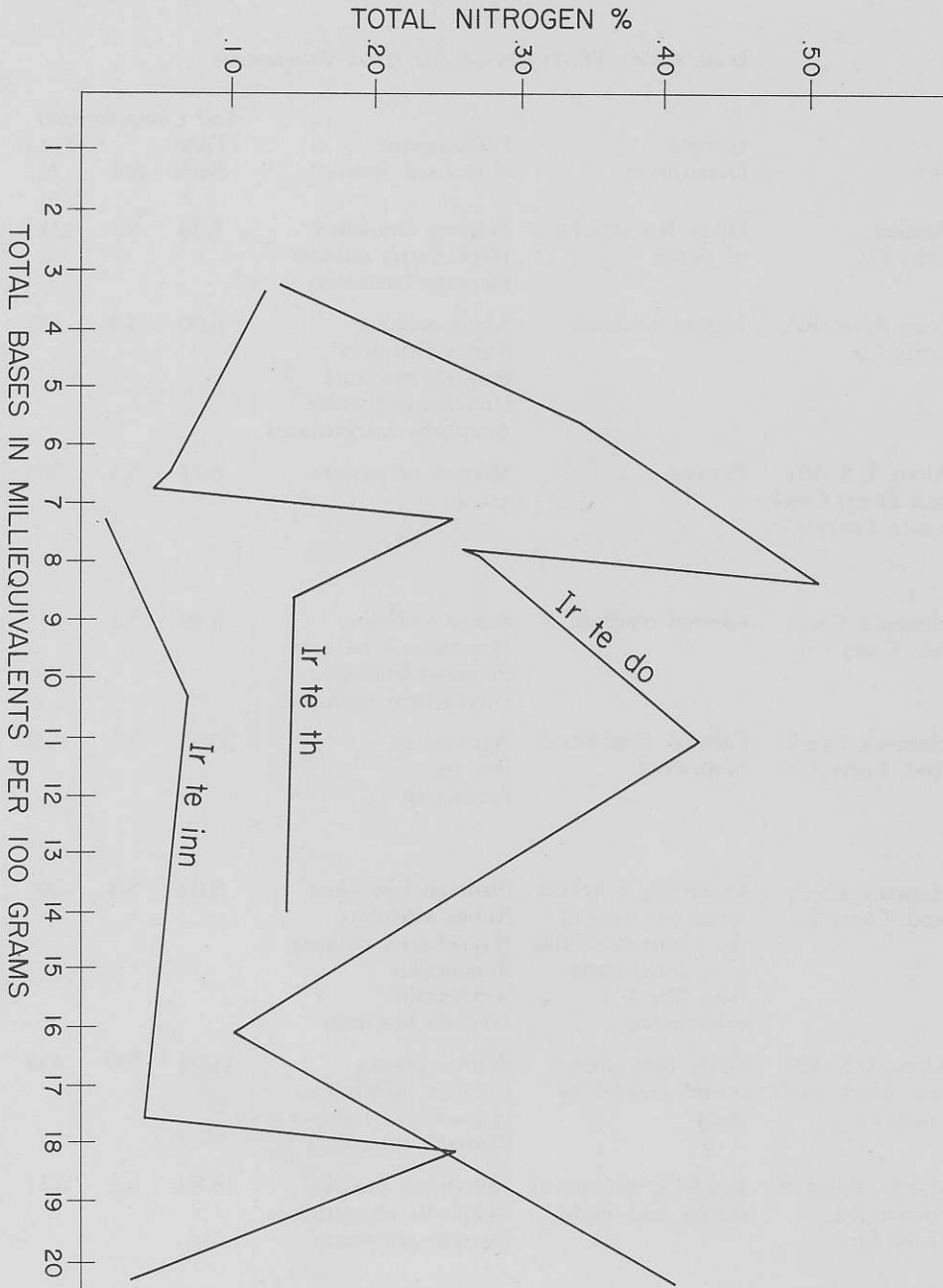


Figure 2. Relationship of total soil nitrogen to total soil bases at various sites of *Iris tenax douglasiana*, *I. t. innominata* and *I. t. thompsonii*.

TABLE 1
 ECOLOGICAL FEATURES OF *Iris tenax douglasiana*

Site	General Description	Predominant Associated Species	Soil Characteristics		
			Total Bases	pH	Total N
Bandon, Coos Co.	Open, flat area back of dunes	<i>Fragaria chiloensis</i> <i>Hypochaeris radicata</i> <i>Plantago lanceolata</i>	7.30	5.7	.253
Sixes River Rd., Curry Co.	Logged roadside	<i>Alnus oregona</i> <i>Rubus vitifolius</i> <i>Fragaria bracteata</i> <i>Holodiscus discolor</i> <i>Anaphalis margaritacea</i>	6.00	5.3	.322
Along U.S. 101 near Floras Creek resort, Curry Co.	Pasture	Mixture of pasture grasses	8.21	5.5	.508
Hunter's Creek Rd., Curry Co.	Cleared roadside	<i>Rubus vitifolius</i> <i>Hypochaeris radicata</i> <i>Plantago lanceolata</i> <i>Polystichum munitum</i>	3.39	5.2	.132
Hunter's Creek road, Curry Co.	Cleared, abandoned homestead	<i>Agrostis</i> sp. <i>Poa</i> sp. <i>Festuca</i> sp.	20.55	5.3	.420
Hunter's Creek road, Curry Co.	Essentially a hybrid stand but most of the plants more like <i>I. t. douglasiana</i> than like <i>I. t. innominata</i>	<i>Plantago lanceolata</i> <i>Rubus vitifolius</i> <i>Hypochaeris radicata</i> <i>Ranunculus occidentalis</i> <i>Fragaria bracteata</i>	8.01	5.4	.266
Along U.S. 101 near Mack Arch, Curry Co.	Open hills above ocean. Grazed by sheep	Pasture grasses <i>Achillea millefolium</i> <i>Hypochaeris radicata</i> <i>Plantago lanceolata</i>	11.04	5.6	.438
Myrtle Point to Powers Rd., Curry Co.	Roadside mixture of shrubs and herbs	<i>Holodiscus discolor</i> <i>Anaphalis margaritacea</i> <i>Dactylis glomerata</i>	15.89	6.3	.111
Harris Beach State Pk., Curry Co.	Pasture-like park area	<i>Bellis perennis</i> <i>Fragaria bracteata</i> <i>Lonicera ciliosa</i>	6.31	5.6	.407

TABLE 2

ECOLOGICAL FEATURES OF *Iris tenax innominata*

Site	General Description	Predominant Associated Species	Soil Characteristics		
			Total Bases	pH	Total N
Hunter's Creek Rd., Curry Co.	Serpentine outcrop on ridge	Mosses Berberis pumila Holodiscus discolor	18.59	6.2	.260
Hunter's Creek road, Curry Co.	Gentle grassy slope in serpentine. Logged	Rosa gymnocarpa Dactylis glomerata	17.20	6.6	.055
Near Myrtle Grove Forest Camp, Powers-Agness Rd., Curry Co.	Edge of road cut	Anaphalis margaritacea occidentalis Rubus parviflorus Rosa gymnocarpa	12.61	5.7	.063
Near site above	Dry sandy bank	None in immediate vicinity	20.39	6.4	.037
Near Agness, Curry Co.	Dry road bank	None in immediate vicinity	7.23	6.4	.027
Daphne Grove forest camp, Curry Co.	Flat area under Umbellularia californica	Umbellularia californica	10.28	5.3	.065

Discussion

The data presented in the tables and in Figure 2 indicate that the two parental subspecies vary more or less inversely in their tolerance and competitive ability in regard to soil nitrogen and total bases. It can be noted that *I. t. douglasiana* tends to occupy soils high in total nitrogen and low in total bases whereas *I. t. innominata* (as might be expected of an organism found on serpentine outcrops) occupies soils which are low in total nitrogen but high in total bases. In addition, *I. t. douglasiana* appears to be a subspecies of essentially open habitats such as logged areas, pastures, etc. (see Table 1). *I. t. thompsonii* has been found on soils intermediate between the two parents in regard to the factors discussed above (see Figure 2). It could not, therefore, be expected to compete successfully with either of the parental subspecies in the parental habitats. However, an area south and east of the range of *I. t. innominata* and east of the coastal habitats of *I. t. douglasiana* (see Figure 1) provides a suitable habitat which cannot, apparently, be occupied by either parent. This area consists mainly of soils derived from sedimentary rock of the Dothan formation with considerable slaty outcroppings (Wells, 1961).

TABLE 3
 ECOLOGICAL FEATURES OF *Iris tenax thompsonii*

Site	General Description	Predominant Associated Species	Soil Characteristics		
			Total Bases	pH	Total N
Along U.S. 101, 5 mi. N. of Brookings, Curry Co.	Road cut	Gaultheria shallon Vaccinium parvifolium	3.10	5.3	.121
Near Jedia Smith St. Pk., Del Norte Co., Calif.	Rocky road bank	Festuca megalura Ceanothus thyrsiflorus Whipplea modesta	6.29	5.8	.054
Grassy Flats Forest Camp, Del Norte Co., Calif.	Flat, rocky area	Rhus diversiloba Lithocarpus densiflora Whipplea modesta	8.58	6.0	.149
Along U.S. 101, abt. 11 mi. N. of Brookings, Curry Co.	Rocky, roadside area	Castanopsis chrysophylla Lithocarpus densiflora Pseudotsuga menziesii	7.23	5.3	.249
10 mi. up N. bank of the Chetco R. from Brookings, Curry Co.	Steep roadside bank	None	6.82	5.3	.045
3 mi. S. of Carpenterville, Curry Co.	Flat, rocky area	Mosses	14.18	6.3	.149

Summary

Data are presented which suggest that *I. t. thompsonii* is not only morphologically intermediate between its parental subspecies (Clarkson, 1959) but is also physiologically intermediate. The availability of a suitable habitat has resulted in the evolution of a new subspecies rather than a more extensive increase in variability of the parents.

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