

**Addendum 4 to Traversing Swanton Road (22nd ed.)
Research Material Relative to Carex x imperfecta Study
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Data pertinent for a science based research project with the Carex x imperfecta (putative natural hybrid between C. densa/sect. Multiflorae x C. subbracteata/sect. Ovales), its relationship with proposed new taxa, C. "nitidicarpa" and C. "gianonei".

On pages 13-14, 19-20, 51-56, 59-61, 65, 95, 100, 104 and 230-231 of the Traversing Swanton Road Essay (2/22/2016), are several in depth overviews detailing the need to clarify the taxonomic status of this yet to be resolved group of hybrids. With the exception of the data presented here, no genetically based studies have been implemented, to determine if Carex x imperfecta is a new to science taxon derived from the combination of two separate sections of the genus Carex..... namely, C. densa (sect. Multiflorae) x C. subbracteata (sect. Ovales), its relationship with C. "nitidicarpa" (a putatively fertile cross between C. densa x C. subbracteata) and the polymorphic C. "gianonei", which is not only fertile and when raised from achenes, produces the same morphologically distinct combination of traits that distinguishes its maternal parent but combines other traits that appear to arise from a third section (Montanae/C. brevicaulis).

Several of the herbarium pressings that were originally pressed in situ from material still residing in the areas circumscribed by the Traversing Swanton Road Essay, have been diagnosed as being C. harfordii (sect. Ovales), C. subbracteata (sect. Ovales) or as in the case of C. x imperfecta, C. harfordii x C. subbracteata, all of this contrary to forty years of observing these taxa in situ and finding no consensus as to just what is occurring..... since no in depth molecular workups have been done and all of the varying interpretations for what any of these locally widespread taxa are, is wholly based on visual observations, some of which blatantly contradict the physical properties of the specimens in hand.

A scientific based approach to this taxonomic conundrum, would begin with C. x imperfecta, of which there are more than 200 hundred examples within the Scott Creek Watershed and collect divisions of at least 60 or 70 in situ plants and raise them out over the course of two or more seasons and once stabilized in their new environment, do extensive morphological workups, DNA profiling and pollen fertility (since C. x imperfecta is pistillately non-functional), an overview of how fertile the staminate part of the sexual equation is and if fertility varies from plant to plant. From the DNA studies, does C. x imperfecta combine genetic material derived from both C. densa and C. subbracteata and does this hybrid combination have its own genetic signature, which upon examining the fertile C. "gianonei" syngameon, appears in that taxon's genetic makeup?

By consulting the UC/JEPS: Consortium, CCH1..... one can see several herbarium pressings of the aforementioned Carex hybrids, several of the pressings digitally reproduced and if carefully examined under full resolution, the reduced paniculate branches derived from C. densa become

readily apparent, a character trait that is not part of the circumscription for either *C. harfordii* or *C. subbracteata*. There are also several herbarium pressings, for these yet to be determined taxa housed in the Jepson Herbarium (UC Berkeley), that were pressed in situ on what is now CalPoly/Swanton Pacific Ranch's holdings but are listed only under the genus name, *Carex*. Definitely worth a visit to the Jepson to see first hand, these specimens and perhaps someone looking for an original Masters or Doctoral thesis in species formation through the broaching of reproductive isolating mechanisms via ecological disturbance, could begin with the 100+ examples of *C. x imperfecta* growing on the Swanton Pacific Ranch's section of the Western Terrace, between the Pumpkin Field Marsh and the China Ladder Marsh. Below listed, are several categories of herbarium pressings, that underscore the need for serious research to be applied to this taxonomic morass in need of clarification.

Herbarium pressings with digital images that represent *Carex x imperfecta* and *Carex "nitidicarpa"*:

SEINET8991572, 2002-1, (collection #52)
 SEINET8991573, 2002-1, (collection #64)
 SEINET4290916, 2002-1, (collection #57)
 SEINET4290917, 2002-1, (collection #51)
 SEINET7486518, 2002-1, (collection #62)

Herbarium pressings of *C. x imperfecta* inflorescences but mislabeled as *C. densa*:

UCSC010763, 2016-7-2, (collection #136)
 UCSC010764, 2016-7-2, (collection #135)

Herbarium pressings filed only under the name *Carex* but represent an important overview of the *C. "gianonei"* complex:

JEPS82942, Buck & West 19.1, 1983-3-14
 JEPS82943, Buck & West 22.1, 1983-3-14
 JEPS82956, West 46.1, 1983-4-13
 JEPS82957, West 48.1, 1983-4-15
 JEPS83089, West 328, 1985-2-15
 JEPS82939, West 11.2, 1983-2-15
 JEPS82940, West 16, 1983-3-9
 JEPS82941, West 17.1, 1983-3-11
 JEPS82944, West 23.1, 1983-3-19
 JEPS82945, West 26.1, 1983-3-2
 JEPS82950, West 34.1, 1983-3-30
 JEPS82951, West 35.1, 1983-4-1
 JEPS82955, West 42.2, 1983-4-9
 JEPS82968, West 207.1, 1984-4-6
 JEPS82969, West 213.1, 1984-4-22
 JEPS82970, West 216.1, 1984-4-24
 JEPS83024, West 296, 1985-1-5
 JEPS85180, Buck & West 487, 1984-5-7
 UCSC006162, James West, s.n., 1978-2-1

Google Earth coordinates for areas within the Scott Creek Watershed that specimens of *Carex x imperfecta* have been documented, either by pressings or mature inflorescence collections.....

Beaver Flat Marsh: 37.094403, -122.256651, elevation 596ft
s-end of Laguna de las Trancas: 37.087523, -122.259251, elevation 585ft

West Spring Marsh: 37.089377, -122.255552, elevation 471ft

Marti's Park Marsh: 37.087823, -122.253680, elevation 359ft

area above Sandy Bottom Reservoir: 37.073970, -122.252281, elevation 476ft

Pumpkin Field Marsh: 37.073300, -122.254128, elevation 410ft

s-facing slope below Grey Hayes Test Plot: 37.069661, -122.251022, elevation 452ft

coastal prairie between Big Willow Gulch and Morehus Arroyo:
37.070132, -122.253244, elevation 377ft