MN NWAC Risk Assessment Worksheet (04-2011)	Common Name	*Latin Name*
	Common Teasel	*Dipsacus fullonum L.*
Reviewer	**Affiliation/Organization**	**Date (mm/dd/yyyy)**
Original Reviewer: Roger Becker	**University of Minnesota**	**05/23/2011**
Current Reviewer: Ken Graeve	**Minnesota Department of Transportation**	**9/10/2016**

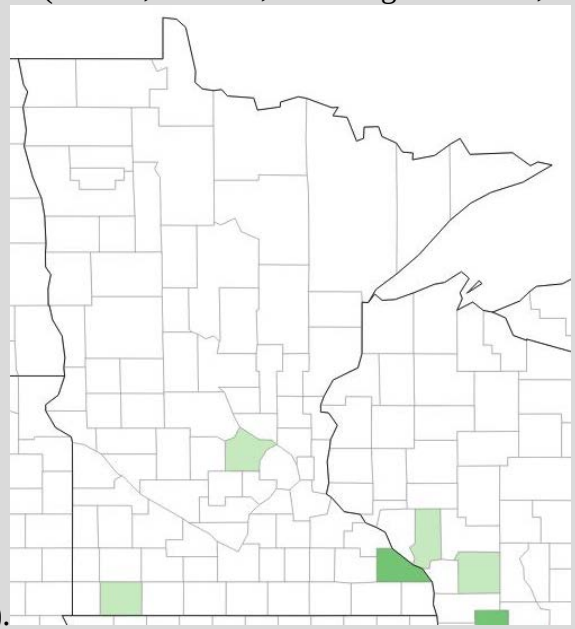
Species Description from the Minnesota Department of Agriculture Common Teasel web page (accessed 9/10/2016): http://www.mda.state.mn.us/plants/pestmanagement/weedcontrol/noxiouslist/commonteasel.aspx

Common teasel is a native of Europe and was introduced to the United States in the 1700s. Like its close relative cutleaf teasel, it was used in the textile industry to raise the nap on woolen cloth and as an ornamental in gardens and floral arrangements. It escaped cultivation and has since spread throughout the United States.

- Common teasel is a monocarpic perennial that produces seed only once in its lifetime.
- It will germinate from seed and stay in a rosette form until it has enough resources to produce a flowering stalk.
- The plant has a strong, deep taproot and prickly stems and leaves. Grazing animals will not eat the leaves and stems.
- The leaves are long, narrow, unlobed, and meet at the stem to form a cup that holds water.
- The flowers are produced on a 6 foot or taller stalk and are distinctive for their bristly, egg shape and light pink color. The plant flowers from June until October.

Common teasel prefers sunny areas and is tolerant of wet to dry soils. In Western states, it is found growing along roadsides, in pastures, and sedge meadows. It was recently discovered growing along a trout stream in southeastern Minnesota.

Risk Assessment Current Summary (2016): Common teasel was originally reviewed in 2011 along with cutleaf teasel (Dipsacus laciniatus). Both were added to the noxious weed list as eradicate species based on that review. Because of ongoing eradication efforts, cutleaf teasel is not being re-reviewed at this time. This review focuses only on common teasel. At the time of the original review, common teasel had been documented once in Minnesota (Bell Museum) but that population was not known to be still viable. In 2015 a small patch was confirmed in that area (EDDMapS). This patch in Winona County is the only known population in the state. Other than this distribution update there is not much new information on common teasel. Because this species is invasive, has the potential to cause ecological harm in Minnesota, and has a very limited distribution, the recommendation is that it remain on the Prohibited: Eradicate section of the noxious weed list.

Box	Question	Answer	Outcome
1	Is the plant species or genotype non-native?	Yes, it is non-native (Gucker 2009).	Go to box 3
3	Is the plant species, or a related species, documented as being a problem elsewhere?	Yes. Common teasel is considered invasive (Rector et al 2006)	Go to box 6
6	Does the plant species have the capacity to establish and survive in Minnesota?	Yes.	Go to box 6A
	A. Is the plant, or a close relative, currently established in Minnesota?	Yes. Three small populations (Nobles, Winona, and Wright counties;  EDDMapS; Bell Museum).	Go to box 7
7	Does the plant species have the potential to reproduce and spread in Minnesota?	Yes.	Go to Box 8

Box	Question	Answer	Outcome
	A. Does the plant reproduce by asexual/vegetative means?	No.	Go to 7C
	C. Does the plant produce large amounts of viable, cold-hardy seeds?	Yes. Each plant may produce over 3,000 seeds, with 70% viability. Common teasel seed production can reach 4,500 seeds/m^2 four years after introduction (Gucker 2009).	Go to 7F
	F. Are sexual propagules – viable seeds – effectively dispersed to new areas?	Yes. Drop within 1.5 m of parent, but float for up to 22 days w/o loss of viability. Teasel is often spread along roadsides by highway maintenance practices and is might also be spread by use in floral arrangements and by birds (Gucker 2009).	Go to Box I
	G. Can the species hybridize with native species (or other introduced species) and produce viable seed and fertile offspring in the absence of human intervention?	**Yes, with cutleaf teasel (Gucker 2009).**	**This text is provided as additional information not directed through the decision tree process for this particular risk assessment.**
	I. Do natural controls exist, species native to Minnesota, that are documented to effectively prevent the spread of the plant in question?	No.	Go to Box 8

Box	Question	Answer	Outcome
8	Does the plant species pose significant human or livestock concerns or has the potential to significantly harm agricultural production, native ecosystems, or managed landscapes?	Yes	
	A. Does the plant have toxic qualities, or other detrimental qualities, that pose a significant risk to livestock, wildlife, or people?	No. No information found that documents this.	Go to 8B
	B. Does, or could, the plant cause significant financial losses associated with decreased yields, reduced crop quality, or increased production costs?	No. not a pasture or cropland weed No information found that documents this. It does grow in pastures but doesn't appear to be outcompeting grasses in that setting, possibly because it is sometimes eaten by cattle.	Go to 8C
	C. Can the plant aggressively displace native species through competition (including allelopathic effects)?	Yes. Rosettes eventually form dense stands that shade out most other herbaceous plants (Gucker, 2009).	Go to Box 9
	E. Does the plant have the potential to change native ecosystems (adds a vegetative layer, affects ground or surface water levels, etc.)?	**Yes. The dense carpets of rosettes displace grasses to such an extent that they are no longer a dominant component of the plant community.**	**This text is provided as additional information not directed through the decision tree process for this particular risk assessment.**

Box	Question	Answer	Outcome
9	Does the plant species have clearly defined benefits that outweigh associated negative impacts?	No	
	A. Is the plant currently being used or produced and/or sold in Minnesota or native to Minnesota?	No…It is not native to Minnesota (Gucker 2009) and is not produced or sold in Minnesota (MDA 2015). If there is any use it likely consists only of occasional use in flower arrangements, but not by professional florists	Go to Box 10
10	Should the plant species be enforced as a noxious weed to prevent introduction &/or dispersal; designate as prohibited or restricted?	Yes	
	A. Is the plant currently established in Minnesota?	Yes, there are three known infestations (EDDMapS, Bell Museum)	Go to 10B
	B. Does the plant pose a serious human health threat?	No.	Go to 10C
	C. Can the plant be reliably eradicated (entire plant) or controlled (top growth only to prevent pollen dispersal and seed production as appropriate) on a statewide basis using existing practices and available resources?	The plant can be killed by pulling, digging, or herbicide treatments. Mowing not that effective as regenerates flower stalk. The extremely limited distribution of this species in Minnesota makes it an ideal candidate for eradication.	Maintain current status as a Prohibited / Eradicate Noxious Weed.

Box	Question	Answer	Outcome
11	Should the plant species be allowed in Minnesota via a species-specific management plan; designate as specially regulated?		
Final Results of Risk Assessment			
	Review Entity	**Comments**	**Outcome**
	2011 NWAC Listing Subcommittee	Recommended to be regulated as a Prohibited Noxious Weed on the Eradicate List	List as a Prohibited Eradicate Species
	2011 NWAC Full-group	Full members approved listing subcommittee's recommendation.	List Both Species as Prohibited - Eradicate
	2011 MDA Commissioner	Commissioner approved NWAC recommendation (12/15/2011).	**Both Species listed as Prohibited- Eradicate**
	2016 NWAC Listing Subcommittee re-review	Common teasel continues to pose a threat due to its invasive potential. It is now confirmed to exist in Minnesota but only in three locations. This limited distribution and the availability of multiple control options make this species an ideal candidate for the Prohibited / Eradicate list.	Maintain current status as a Prohibited / Eradicate Noxious Weed.
	2016 NWAC Full-group	Voted to accept the listing subcommittee's recommendation.	Prohibited-Eradicate
	2016 MDA Commissioner	Accepted NWAC's recommendation (02/06/2017)	**Prohibited-Eradicate**
	FILE #	**MDARA00057COMTE_9_10_2016**	

References:
(List any literature, websites, and other publications)

Bentivegna, Diego J. Smeda, Reid J. 2008. Chemical Management of Cut-Leaved Teasel (Dipsacus Laciniatus) in Missouri. Weed technology. 22(3) p. 502-506.

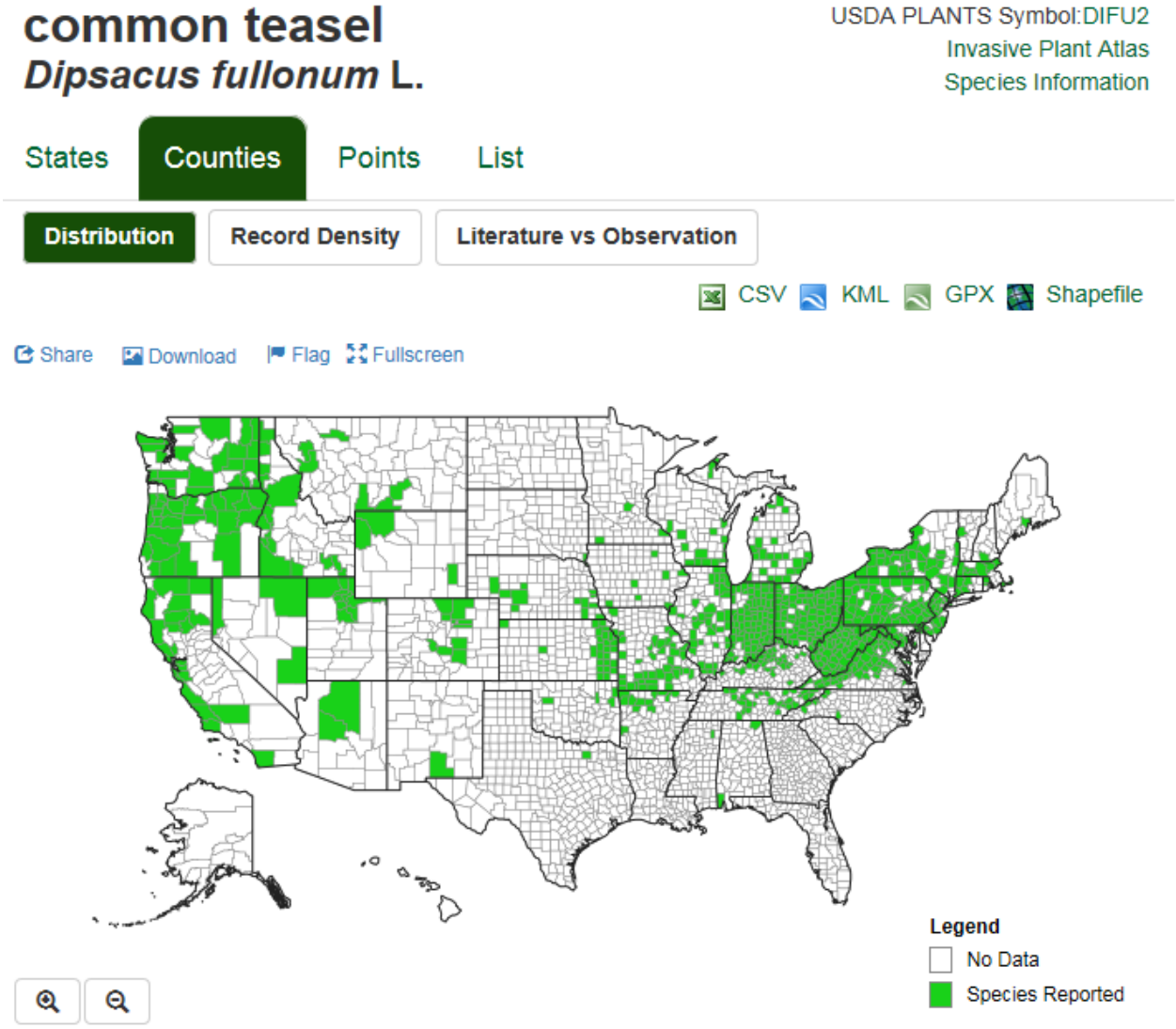
Gucker, Corey L. 2009. Dipsacus fullonum, D. laciniatus. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis [2016, August 10].

MDA (Minnesota Department of Agriculture). 2015 Nursery Staff Noxious Weed Survey. Unpublished data from MDA nursery inspections.

Rector, B.G. Harizanova, V. Sforza, R. Widmer, T. Wiedenmann, R.N. 2006. Prospects for biological control of teasels, Dipsacus spp., a new target in the United States. Biological control : theory and application in pest management. 36(1) p. 1-14.

Appendices

EDDMapS Distribution Map



Additional Literature

Date: May 19, 2011 8:08:36 AM CDT
Ovid Technologies, Inc. Email Service

Search for: dipsacus/
Results: 20

1. The osteoprotective effect of Radix Dipsaci extract in ovariectomized rats
Liu, Zhen-Guo Zhang, Rong Li, Chen Ma, Xue Liu, Li Wang, Jie-Pin Mei, Qi-Bing
Journal of ethnopharmacology. 2009 May 4. 123(1) p. 74-81.
AN: IND44195539.
Aim: The objective of the present study was to systematically evaluate the effects of Radix Dipsaci extract (RDE) on postmenopausal osteoporosis. Materials and methods: OVX or sham operations were performed on sixty 3-month-old virgin Sprague-Dawley rats that were divided into six groups: sham control group (sham, n =10); OVX control group (OVX, n =10); 17o-estradiol treatment group (E2, n =10); three Radix Dipsaci extract treatment groups RDE100 (n =10), RDE300 (n =10) and RDE500 (n =10). The treatment began 4 weeks after the surgery and lasted for 16 weeks. Bone mass, bone turnover and strength were analyzed by DEXA, biochemical markers and three-point bending test. The trabecular bone microarchitecture was evaluated by MicroCT. Results: 16 weeks treatment of RDE slowed down the body weight gain and prevented the loss of bone mass induced by the OVX. The prevention effect on bone loss was due to altering the rate of bone remodeling, which could be inferred from the decreased level of bone turnover markers, such as serum ALP, OC and urinary DPD. The changes of urinary calcium and phosphorus excretion provided the same evidence. The treatment could also enhance the bone strength and prevent the deterioration of trabecular microarchitecture. Conclusions: Our study provides evidence that Radix Dipsaci extract will have potential to be used for treatment of postmenopausal osteoporosis.
Link to the Ovid Full Text or citation: http://ovidsp.ovid.com/ovidweb.cgi?
T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=agra6&AN=IND44195539

2. Chemical Management of Cut-Leaved Teasel (Dipsacus Laciniatus) in Missouri
Bentivegna, Diego J. Smeda, Reid J.
Weed technology. 2008 July. 22(3) p. 502-506.
AN: IND44109781.
Link to the Ovid Full Text or citation: http://ovidsp.ovid.com/ovidweb.cgi?
T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=agra6&AN=IND44109781

3. A New Species of Leipothrix (Acari: Prostigmata: Eriophyidae) on Dipsacus spp. in Europe and Reassignment of Two Epitrimerus spp. (Acari: Prostigmata: Eriophyidae) to the Genus Leipothrix
Petanovic, R.U. Rector, B.G.
Annals of the Entomological Society of America. 2007 Mar. 100(2) p. 157-163.
AN: IND43938391.
A new species of eriophyid mite, Leipothrix dipsacivagus n. sp. (Acari: Prostigmata: Eriophyidae), collected from Dipsacus laciniatus L. (Dipsacaceae) and Dipsacus fullonum L. in Serbia, Bulgaria, and France, is described and illustrated. Differential diagnosis is provided in comparison with Leipothrix knautiae (Liro) n. comb., and Leipothrix succisae (Roivainen) n. comb., two species that also are proposed here for reassignment from the genus Epitrimerus Nalepa to the genus Leipothrix Keifer, within the family Eriophyidae. L. dipsacivagus n. sp. is being investigated as a candidate for biological control of invasive Dipsacus spp. in the United States.
Link to the Ovid Full Text or citation: http://ovidsp.ovid.com/ovidweb.cgi?
T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=agra6&AN=IND43938391

4. Prospects for biological control of teasels, Dipsacus spp., a new target in the United States
Rector, B.G. Harizanova, V. Sforza, R. Widmer, T. Wiedenmann, R.N.
Biological control : theory and application in pest management. 2006 Jan. 36(1) p. 1-14.
AN: IND43772591.
Two closely related teasels (Dipsacales: Dipsacaceae, Dipsacus spp.) of European origin have become invasive weeds in the United States. Common teasel (Dipsacus fullonum L.) and cutleaf teasel (Dipsacus laciniatus L.) have likely been in North United States. Common teasel (Dipsacus fullonum L.) and cutleaf teasel (Dipsacus laciniatus L.) have likely been in North America for more than two centuries, having been introduced along with cultivated teasel [D. sativus (L.) Honckney], an obsolete crop plant. There are few records of American insects or pathogens attacking Dipsacus spp. Invasive teasels have recently begun to spread rapidly throughout much of their current range, for reasons that are not yet known. Common and/or cut-leaf teasel have been listed as noxious in five US states and as invasive in 12 other states and four national parks. Because the family Dipsacaceae is an exclusively Old World family, classical biological control is an important component of the overall management strategy of this weed in the US. Field surveys for natural enemies of D. fullonum and D. laciniatus in their native ranges and literature reviews of natural enemies of plants in the family Dipsacaceae have yielded 102 species of insects in six orders, as well as 27 fungi from 10 orders, three mites, one nematode, and two viruses. Due to the biennial nature of these weeds, a strategy to assign highest priority to biological control candidates attacking first-year (rosette) plants has been established. Candidates selected for further study based on this strategy include Chromatomyia ramosa (Hendel) (Diptera: Agromyzidae), Longitarsus strigicollis Wollaston (Coleoptera: Chrysomelidae), Epitrimerus knautiae Liro (Acarina: Eriophyiidae), Euphydryas desfontainii (Godart) (Lepidoptera: Nymphalidae), Erysiphe knautiae Duby (Erysiphales: Erysiphaceae), and Sphaerotheca dipsacearum (Tul. and C. Tul.) (Erysiphales: Erysiphaceae).
Link to the Ovid Full Text or citation: http://ovidsp.ovid.com/ovidweb.cgi?
T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=agra6&AN=IND43772591

5. Antioxidant activity of caffeoyl quinic acid derivatives from the roots of Dipsacus asper Wall
Hung, T.M. Na, M.K. Thuong, P.T. Su, N.D. Sok, D.E. Song, K.S. Seong, Y.H. Bae, K.H.
Journal of ethnopharmacology. 2006 Nov. 24. 108(2) p. 188-192.
AN: IND43867435.
The methanol extract from Dipsacus asper Wall (Dipsacaceae) was found to show antioxidant activity against free radical and Cu2+-mediated LDL oxidation. In further study, to identify active constituents from the plant, six caffeoyl quinic acid derivatives: 3,4-di-O-caffeoylquinic acid (1), methyl 3,4-di-O-caffeoyl quinate (2), 3,5-di-O-caffeoylquinic acid (3), methyl 3,5-di-O-caffeoyl quinate (4), 4,5-di-O-caffeoylquinic acid (5) and methyl 4,5-di-O-caffeoyl quinate (6) were isolated. Their structures were identified by spectroscopic methods including 2D-NMR. The isolated compounds, 1-6, were found to be potent scavengers of the free radical 1,1-diphenyl-2-picrylhydrazyl (DPPH), and are more potent than butylated hydroxyl toluene (BHT) used as a positive control. The compounds 1-6 also inhibited Cu2+-mediated low-density lipoprotein (LDL) oxidation. They increased the lag time of conjugated dienes formation and inhibited the generation of thiobarbituric acid reactive substances (TBARS) in a dose-dependent manner. These results suggested that Dipsacus asper due to its antioxidant constituents, 1-6, may have a role to play in preventing the development and progression of atherosclerotic disease.
Link to the Ovid Full Text or citation: http://ovidsp.ovid.com/ovidweb.cgi?
T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=agra6&AN=IND43867435

6. Neuroprotective effects of 3,5-dicaffeoylquinic acid on hydrogen peroxide-induced cell death in SH-SY5Y cells.
Kim, S.S. Park, R.Y. Jeon, H.J. Kwon, Y.S. Chun, W.
Phytotherapy research : PTR. 2005 Mar. 19(3) p. 243-245.

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7. Antinociceptive mechanisms of Dipsacus saponin C administered intrathecally in mice.
Suh, H.W. Song, D.K. Huh, S.O. Son, K.H. Kim, Y.H.
Journal of ethnopharmacology. July 2000. 71(1-2) p. 211-218.
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8. Fractionation and chemical properties of immunomodulating polysaccharides from roots of Dipsacus asperiodes.
Zhang, Y. Kiyohara, H. Matsumoto, T. Yamada, H.
Planta medica. Oct 1997. 63(2) p. 393-399.
AN: IND21237642.
Link to the Ovid Full Text or citation: http://ovidsp.ovid.com/ovidweb.cgi?
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9. An iridoid glucoside from Dipsacus asperoides.
Tomita, H. Mouri, Y.
Phytochemistry. May 1996. 42(1) p. 239-240.
AN: IND20519809.
A new iridoid glucoside, loganic acid-6'-O-beta-D-glucoside, has been isolated from the defatted root of Dipsacus asperoides. Its structure has been elucidated by spectroscopic means as 1S-(1 alpha,4a alpha,6 alpha,7 alpha,7a alpha)-1 [(6-O-beta-D-glucopyranosyl-beta-D-glucopyranosyl) oxy]-1 alpha, 4a alpha,5,6,7,7a-hexahydro-6-hydroxy-7- methyl-cyclopenta[c]pyran-4-carboxylic acid.
Link to the Ovid Full Text or citation: http://ovidsp.ovid.com/ovidweb.cgi?
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10. Triterpene glycosides from the roots of Dipsacus asper.
Jung, K.Y. Do, J.C. Son, K.H.
Journal of natural products. Nov 1993. 56(11) p. 1912-1916.
AN: IND20365375.
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T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=agra4&AN=IND20365375

11. New bis-iridoids from Dipsacus laciniatus.
Kocsis, A. Szabo, L.F. Podanyi, B.
Journal of natural products. Sept 1993. 56(9)
AN: IND20359786.
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12. Nitrogen and carbohydrate storage in biennials originating from habitats of different resource availability.
Steinlein, T. Heilmeier, H. Schulze, E.D.
Oecologia. 1993. 93(3) p. 374-382.

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13. Duplication of the structural gene for glucosephosphate isomerase and phosphogluconate dehydrogenase in Scabiosa columbaria and their phylogenetic implications in the Dipsacaceae.
Treuren, R. van. Bijlsma, R.
Biochemical genetics. Feb 1992. 30(1-2) p. 99-109.
AN: IND92044441.
Zymograms of glucosephosphate isomerase (GPI) and phosphogluconate dehydrogenase (PGD) revealed three isozymes for each enzyme in the plant species Scabiosa columbaria. Intergenic heterodimers are formed between the polypeptides coded by Gpi-1 and Gpi-2 and between those coded by Pgd-1 and Pgd-2, indicating that a GPI and a PGD locus have been duplicated in the past. The ancestral genes assort independently with their duplicated gene, suggesting that the duplications have originated from a process of translocation. Linkage was found only between Gpi-1 and Pgd-2 and between Gpi-2 and Pgd-1, suggesting that the duplicated loci were located on the same translocated chromosomal segment. Both duplications are present in all other examined species of Scabiosa and in Cephalaria and Knautia, two other genera of the Dipsacaceae. The genera Succisa and Dipsacus, also belonging to the Dipsacaceae, do not show Gpi-1 activity, making Gpi-2 and Pgd-1 the most likely ancestral genes. In Succisa, the isozymes of Gpi-1 and Gpi-2 either overlap or Gpi-1 has been silenced. The combined results suggest that a chromosomal segment containing Gpi-2 and Pgd-1 has been translocated before the divergence of Scabiosa, Cephalaria, Knautia, and Succisa.
Link to the Ovid Full Text or citation: http://ovidsp.ovid.com/ovidweb.cgi?
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14.Bisiridoids from Dipsacus species.
Kocsis, A. Szabo, L.F. Tetenyi, P. Podanyi, B.
Acta horticulturae. May 1992. (306). p. 276-280.
AN: IND93001410.
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15.Phenolic glucoside and other constituents of Dipsacus laciniatus.
Abdallah, O.M.
Phytochemistry. 1991. 30(8) p. 2805-2806.
AN: IND91036608.
From Dipsacus laciniatus was isolated a new phenolic glucoside named dipsaicin in addition to the known iridoid glucosides, sylvestroside 11 and loganin aglucone. Ursolic acid was also isolated from the plant.
Link to the Ovid Full Text or citation: http://ovidsp.ovid.com/ovidweb.cgi?
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Kouno, I. Tsuboi, A. Nanri, M. Kawano, N.
Phytochemistry. 1990. 29(1) p. 338-339.
AN: IND90011908.
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17. Laciniatoside V: a new bis-iridoid glucoside. Isolation and structure elucidation by 2D NMR spectroscopy.
Podanyi, B. Reid, R.S. Kocsis, A. Szabo, L.
Journal of natural products. Jan/Feb 1989. 52(1) p. 135-142.
AN: IND89031276.
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18. Hederagonic acid from Dipsacus azureus.
Kamilov, Kh.M. Putieva, Zh.M. Khalmatov, Kh.Kh. Abubakirov, N.K.
Chemistry of natural compounds. May 1987. 22(6) p. 741-742.
AN: IND87075149.
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Baumgartner, D.L.
Journal of the American Mosquito Control Association. Sept 1986. 2(3) p. 371-373.
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Xifreda, C.C.
Darwiniana. 1986. 27(27) p. 559-560.
AN: IND88017515.
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