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Pyrrolizidine alkaloid variation in *Jacobaea* hybrids : influence on resistance against generalist and specialist insect herbivores

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Cover Page



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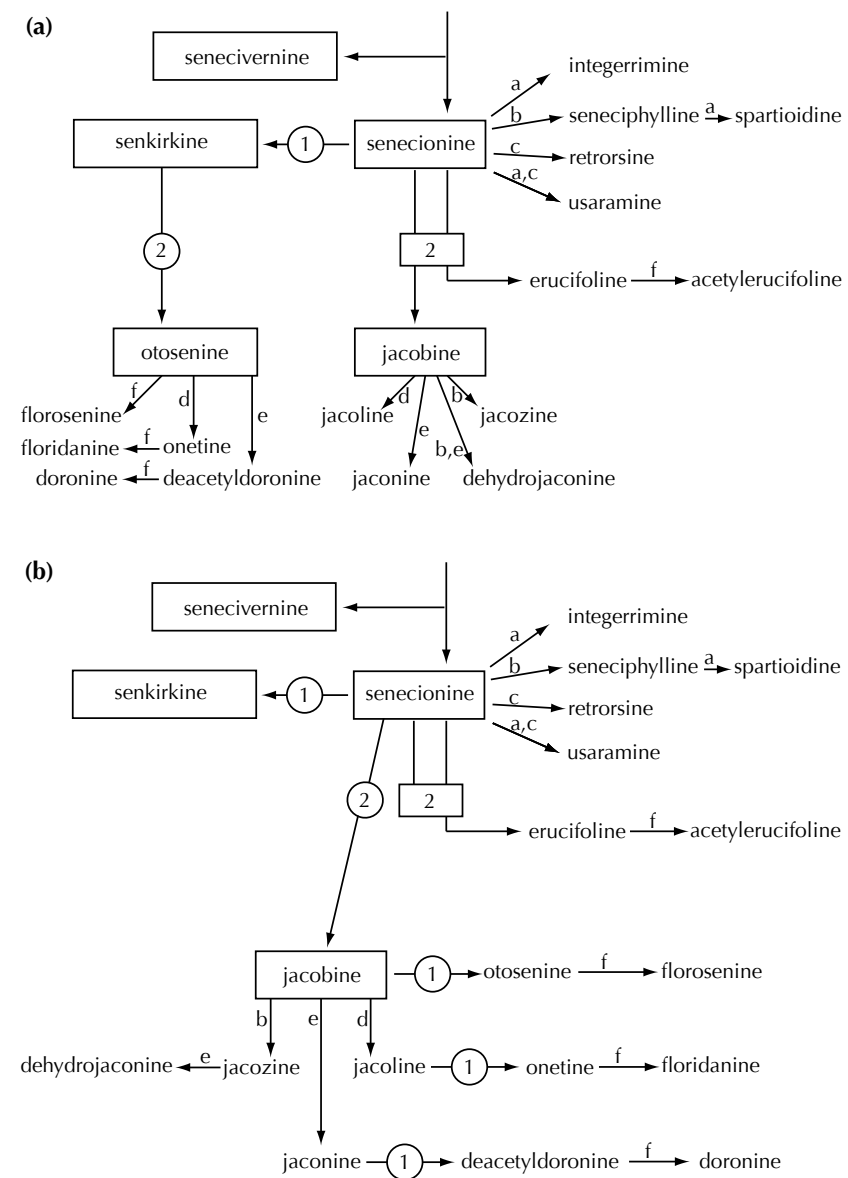


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Author: Cheng, Dandan

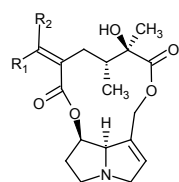
Title: Pyrrolizidine alkaloid variation in *Jacobaea* hybrids : influence on resistance against generalist and specialist insect herbivores

Date: 2012-04-18

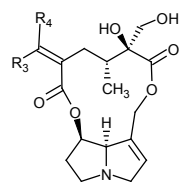


Appendix 1 Putative biosynthetic pathways for diversification of PAs in the *Jacobaea* section. With the exception of senecivernine, senecionine is the common precursor of all other PAs. Since the substrate specificity of the enzymes involved is not known, two scenarios are illustrated: (a) = senkirikine is assumed to be a common precursor of all otonecine derivatives; (b) = the otonecine derivatives originate independently from the respective retronecine derivatives. Two main reactions exist: conversion of retronecine to otonecine (reaction 1) and site-specific epoxide formation (reaction 2). Further structural diversification requires six simple one-step-reactions marked by letters a–f: a = Z/E-isomerization at C20; b = 13, 19-dehydrogenation; c = site-specific hydroxylations; d = hydrolysis of 15,20-epoxide; e = chlorolysis of 15,20-epoxide; f = site-specific O-acetylations. Adapted from Pelsler et al (2005).

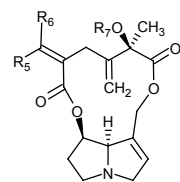
Senecionine - like PAs



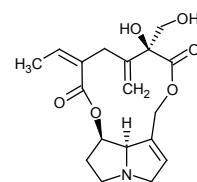
$R_1 = \text{CH}_3, R_2 = \text{H}$ Senecionine
 $R_1 = \text{H}, R_2 = \text{CH}_3$ Integerrimine



$R_3 = \text{CH}_3, R_4 = \text{H}$ Retrorsine
 $R_3 = \text{H}, R_4 = \text{CH}_3$ Usaramine

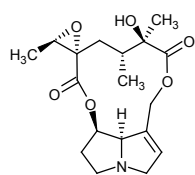


$R_5 = \text{CH}_3, R_6 = \text{H}, R_7 = \text{H}$ Seneciphylline
 $R_5 = \text{CH}_3, R_6 = \text{H}, R_7 = \text{Ac}$ Acetyl-seneciphylline
 $R_5 = \text{H}, R_6 = \text{CH}_3, R_7 = \text{H}$ Spartioidine

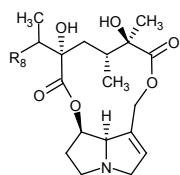


Riddelline

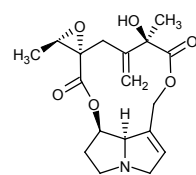
Jacobine - like PAs



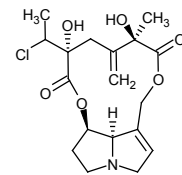
Jacobine



$R_3 = \text{OH}$ Jacobine
 $R_3 = \text{Cl}$ Jacoline

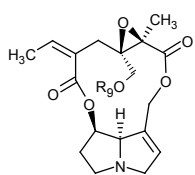


Jacozine

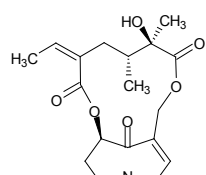


Dehydrojaconine

Erucifoline - like PAs

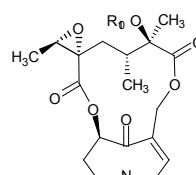


$R_9 = \text{H}$ Erucifoline
 $R_9 = \text{Ac}$ Acetylerucifoline

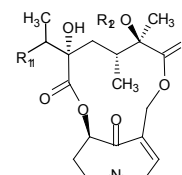


Senkirkine

Otosenine - like PAs



$R_{10} = \text{H}$ Otosenine
 $R_{10} = \text{Ac}$ Florosenine



$R_{11} = \text{OH}, R_{12} = \text{H}$ Onetine
 $R_{11} = \text{OH}, R_{12} = \text{Ac}$ Floridanine
 $R_{11} = \text{Cl}, R_{12} = \text{H}$ Desacetyldoronine
 $R_{11} = \text{Cl}, R_{12} = \text{Ac}$ Doronine