Reseda (Mignonette) in Perfumery

By Danute Pajaujis Anonis, Consulting Chemist Perfumer, Rego Park, NY

Reseda is not a basic floral note in perfumery, but its vibrant green-floral odor gives a special cachet to a fragrance. At the beginning of this century, the natural flower oil of reseda was used in high class perfumes. Today, no natural flower oil is produced, and synthetic reseda compounds are used in perfumery.

Origin, Yield and Mode of Production

Reseda odorata L. (family Resedaceae) originated in Asia Minor. Three varieties were once used for the extraction of the flower oil, i.e. var. gigantea, grandiflora, and pyramidalis.[1]

In 1891, it was reported that steam distilled reseda flowers yielded 0.002 per cent of a volatile oil. The reseda-like odor of this oil became apparent only in strong dilution. Because of the low yield, reseda flowers were co-distilled by Schimmel & Co. with geraniol, and the product was known as "Reseda-Geraniol".[2]

Later, reseda flowers were treated by maceration in melted, heated fat (50° to 70°C), yielding reseda pommades. On treatment with alcohol, lavages were obtained, numbered according to the concentration of the flower oil they contained.[3]

A more modern approach was the extraction with volatile solvents resulting in concrete, and on treatment with alcohol, in absolute reseda oil. Yields ranging from 0.07 to 0.15, and in some cases as high as 0.26 per cent were reported. The concretes gave 30 to 35 per cent of a semi-solid absolute of a red-brown color, which had a strong odor of reseda flower, but more fatty and heavier. The concrete yielded 3.8 to 5.5 per cent the steam-volatile oil.[4] Another source reported a yield of 0.15 to 0.18 of concrete from reseda flowers using the same method of extraction.[5]

In the beginning of this century, up to 40 metric tons of reseda flowers have been processed, but by the middle of the century, the production all but ceased.[6]

Chemical Composition

Not much is known of the chemical composition of reseda flower oil. In the beginning of this century, the presence of farnesol was reported, but it was not firmly established.[7] β-isothiocyanate has been previously identified as the major component of the steam distilled reseda odorata root oil.[8]

Years later, the presence of acetic, caprilic, and solid fatty acids, phenol C_6H_5OH, eugenol and paraffins was established in the volatile oil obtained by co-distillation with ethylene glycol from the concrete of reseda flowers.[9]

Synthetic Compounds

According to Cerbelaud's odor classification, reseda belongs to the transitional group between rose-geranium and violet-orris odors.[10]

The dominant odor of synthetic reseda compounds consists of rose alcohols associated with ionones and their derivatives, irone and other violet components, and also with fruity apricot-like odor tonalities. Jasmin compounds may enhance the bouquet.

Small amounts of phenyl ethyl acetate or phenyl ethyl phenyl acetate may be added for nuance. Farnesol, guaiacwood acetate, phenyl propyl alcohol, ylang, sandalwood, vetiverol or vetiver may serve as modifiers. Phenylacetaldehyde dimethyl acetal, phenylacetalde-

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Table I. Restricted Reseda Components

Reseda components	eliminated	purified	used in conjunction with quenchers	limited percentage
Bergamot		*		
Cinnamic alcohol				4%
Citral			*	
Coumarin derivatives	*			
Farnesol		*		
Hydroxycitronellal				7.5%
Ionones and derivatives		*		
Methyl heptine carbonate				0.01%
Methyl nonyl ketone				3.9%
Musk ambrette	* (skin products)			4% (others)
Orris absolute and concrete	*			
Phenylacetaldehyde			*	
Styrax resinoid		*		

hyde and styrallyl acetate contribute the green odor tonality.

Aldehyde and alcohol C-9, aldehyde and alcohol C-12 (L) may be part of the formula, and aldehyde C-14 (undecalactone) may be added for the fruity note.

Bergamot and linalyl acetate are used for the top note. Coumarin, heliotropin, orris, galbanum and styrax resinoids form the fixative base.

2,4-Dihydroxy-methyl pentanacetal, isopropyl benzyl carbinol and carbinyl acetate were among the less usual aromatics used.[11]

Of the absolutes, genêt, immortelle, jasmin, mimosa, rose and violet leaves may be mentioned.

The conventional early reseda formulas shown as Formulas 1 through 8 may serve as illustration.

Formula Nos. 2 and 3 have a more pronounced violet note, whereas Formula Nos. 4 through 7 are the examples of different types of reseda formulas. Formula No. 8 gives later variation of reseda with the jasmin note predominating.

Natural reseda flower oil has not been available for quite a number of years. Specialties were developed, i.e. Resedine (Givaudan). The availability of new aromatics, such as acetaldehyde phenyl-ethyl-α-propyl acetal, enabled the development of more modern reseda specialties:

Resedafol—Corps 302 (H&R)
Acetal R (Givaudan)

Another specialty is Resedyl Acetal (Dragoco). Among the newer reseda compounds is Reseda Body (IFF 4,4,6-trimethyl-2phenyl-1,3 dioxane).

Synthetic musks, nitro or macrocyclic are not recommended as fixatives in reseda compounds or specialties. They are not compatible with ionones and their derivatives and irones; their odors cancel each other.[19]

As for the dermatological consideration, many former components used in reseda compounds had to be eliminated. A list of such components is given in Table I.

In developing more modern reseda compounds, the perfumer can have recourse to newer aromatics. Among such are:

- Rose oxide, β damascenone (2,6,6, trimethyl-trans-cro-tonylhexadiene,1,3), β damascone, neroli oxide in the rose and neroli odor tonality.
- Methyl dihydro jasmonate (Hedione, Firmenich), *cis*-jamsone, p-tertiary butyl cyclohexanol, pentyl cyclo pentenone (Delphone, Firmenich), hexenyl cyclo pentanone (Hamisgone, Bedoukian) and p-tertiary butyl cyclo hexenol, among others in the jasmin odor tonality.
- Lilial, Lyral, Dupical (Quest), Oncidal (Dragoco), all in the hydroxycitronellal or lily of the valley odor tonality.
- Dodecatrien-1-ol (Farnesol synthetic, Givaudan) and α phenyl propyl aldehyde 2,4-dihyroxy-4-methyl pentane acetal are interesting aromatics for this purpose.
- Nitriles, especially geranyl (Citralva, IFF) cinnamyl (Cinnamalva IFF), nonyl nitrile in the aldehydic and orange odor tonality and α sinensal with a citus note, ocimen epoxide of a green residuous odor.

Formula No. 1
Reseda Bouquet No. 2[12]

	Parts
Aldehyde C-14 10%	2
Guaiacwood acetate	2
Carnation R. Cerb.	5
Phenyl ethyl acetate	2
Cyclamen aldehyde	1
α ionone white	15
Orris absolute	0.5
Bergamot	10
Rose Otto	1
Geraniol	10
Citronellol	10
Rhodinol	5
Heliotropion	10
Coumarin	3
Reseda absolute	5-10
Jasmin absolute	1
Cassie absolute	1
Alcohol 90°	11.5
	100.0

Formula No. 2
Reseda I[13]

	Parts
Ionone α	250
Orris resinoid	50
Methylionone	100
Phenyl propyl acetate	100
Geraniol Palmarosa	200
Phenyl ethyl acetate	75
Styrallyl acetate	25
Methyl nonyl ketone	25
Bergamot	75
Terpineol	100
	1000

Formula No. 3
Reseda II[14]

	Parts
Methyl ionone	300
α ionone	50
Methyl heptine carbonate	10
Aldehyde C-12 10%	20
Benzyl acetate	80
Bergamot	150
Petitgrain	80
Basil	10
Ylang ylang	30
Orris liquid	50
Reseda absolute	20
Linalool	100
Phenyl propyl alcohol	100
	1000

Formula No. 4
Base No. 129[15]
(French reseda type)

	Parts
Reseda absolute	120
α ionone	166
Orris concrete	56
Terpineol extra	152
Rose synthetic	196
Jasmin synthetic	115
Bergamot	103
Sandalwood E.I.	65
Alcohol C-12	12
Ethyl decine carbonate	15
	1000

Formula No. 5
Base No. 130[16]
(German reseda type)

	Parts
Ionone 100% pure	245
Cassie synthetic	99
Terpineol	135
Violet leaves absolute	10
Reseda-Geraniol Schimmel	140
Geranium African	25
Nerol	35
Alcohol C-9	13
Ylang ylang	80
Benzyl acetate	76
Linalool	60
Linalyl acetate	60
Ethyl decine carbonate	20.5
Aldehyde C-10	1.5
	1000

Formula No. 6
Reseda[17]

	Parts
Methyl ionone	300
Reseda absolute	20
Bergamot	160
Phenyl propyl alcohol	100
Aldehyde C-12 (L) 10%	20
Violet leaves absolute	10
Methyl heptine carbonate	10
Orris concrete	40
Methyl hexyl ketone	50
Ylang ylang	30
Musk ambrette	10
Sandalwood E.I.	100
Basil	10
Lavender	10
Petitgrain	70
Resinoid Galbanum	10
Benzyl acetate	50
	1000

Formula No. 7
Reseda[18]

	Parts
Methyl ionone	200
Reseda absolute	50
Bergamot	120
Reseda-Geraniol Schimmel	250
Alcohol C-12 (L)	20
Jasmin absolute	100
Methyl decine carbonate	50
Cassie absolute	50
Orris resinoid	15
Labdanum resinoid	4
Basil	40
Heliotropin	10
Clary Sage	1
Linalool	70
Isobutyl salicylate	20
	1000

Formula No. 8
Reseda RM

	Parts
α amyl cinnamic aldehyde	200
Jasmin synthetic	140
Cinnamic alcohol	90
Heliotropin	90
Benzyl acetate	60
Phenyl propyl acetate	80
Hydroxycitronellal	50
Ionone AB	40
Methyl ionone	40
Phenyl ethyl acetate	40
Orris resinoid	40
Amyl salicylate	30
Cassie synthetic	20
Aldehyde C-12 (L) 10%	20
Aldehyde C-14 (undecalactone) 10%	16
Terpineol	16
Basil	16
Phenylacetaldehyde 10% (Phenyl ethyl alcohol)	16
Phenyl ethyl alcohol	8
Methyl octine carbonate	8
Vanillin	4
Mandarin	4
Musk ketone	2
	1030

- 2-Trans-6-cis nonadien-1-al and nonadien-1-ol, 2-trans-6-cis nonadien-1-al dicthyl acctal, 2-nonyn-1-al dimethyl acetal, cis-hexenyl methyl carbonate (Liffarome, IFF), dimethyl acetal of trans-2-nonylal methyl nonylenate, cis-3-hexenyl heptine carbonate, all in the violet leaf odor tonality.
- 3-oxa-10-ethylidene-tricyclo (6,2,1,0) undecan-4-one (Florex, Firmenich and Coumarex, IFF) of a coumarin-like odor.
- Octahydrotetramethyl naphtalene (Iso E Super, IFF), hydroxy tridecyl tricyclo tridecane (Sandela, Givaudan), methyl cedryl ketone (Vertofix, IFF), cyclo decyl methyl ether (Palisandin, H&R), all in the woody odor tonality.
- Of the pyrazines, sec-butyl methoxy pyrazine and isohexyl methoxy pyrazine of a green metallic odor, the former identified in galbanum oil. Allyl cyclohexyloxyacetate (Cyclogalbanate, Dragoco) and dimethyl cyclohexyl pentenone (Neogall, Firmenich) also have a metallic green galbanum/like odor.
- Among pyridines is Corps Racine (H&R) and Racinal (Dragoco), with a light green and citrus-green odor respectively.
- Among newer aldehydes are 2,6-dodecadienal in the mandarin-orange odor tonality, trans-2-decenal of a citrus-orange note, trans-2-nonenal (orris-like), cis-6-nonenal of a citrus-musk odor and trimethyl undecylenic aldehyde (Farenal, H&R and Adoxal, Givaudan).
- The much used dimethyl heptanol (Dimetol, Givaudan), dihydromyrcenol (lime-herbaceous), ocimenol, ocimenyl acetate (grassy-citrus).
- Of the hexenol esters, the acetate, formate, isobutyrate and tiglate impart green and fruity notes, while the benzoate and salicylate are good fixatives, as well as contributing a floral note.

Application

The vibrant green-floral odor of reseda gives a special cachet to a fragrance, but because of the availability of a wide variety of new aromatics in the green odor tonality, its use is not as widespread as it could be.

Reseda compounds have been used in extracts, lotions and soaps. Today, reseda is no longer used as a floral fragrance per se, but it remains a valuable note in modern perfumery, as the newer reseda specialties attest.

Reseda blends well with jasmin, and it plays a role as a modifier in floral, herbal-green, chypre and woody type fragrances.

It may be more difficult to apply the soft delicate odor of reseda to the strong fruity-floral-green-aldehydic and semi-oriental fragrances of the eighties. Yet, the reseda note has been used to advantage in sophisticated subtle fragrances. A good example of a classical fragrance is Arpège.

Reseda also serves as a component in other compounds, i.e. magnolia, violet.

References

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