Fuel Modification Plant Selection Guidelines

Selecting and locating plants for a Fuel Modification Landscape plan is best done by first focusing on the density and arrangement of plants in relation to structures as a primary consideration. Second, but no less important is choosing zone appropriate plant species based on plant characteristics such as moisture content, resin/pitch and the production of dead litter from leaves, bark, seed pods etc. Avoid creating fuel ladders both vertically and horizontally throughout all zones (see basic fire behavior section below).

The following guidelines are intended to simplify this approach through zone specific compositions up to the property boundary.

5' Ember/Ignition resistant zone

 All efforts shall be made to eliminate any combustible materials including plants, organic mulches, patio furniture etc. This zone has been found to be the most important area to address during planning and future maintenance.

Zone A (30' from the edge of any qualifying structure)

- Zone A should be planted with the least density (limited use of large woody plants) and plant selections should consist of small herbaceous or succulent plants less than 2'-3' in height or regularly irrigated and mowed lawns.
- It is best not to use woody trees, shrubs, subshrubs, perennials or masses of un-mowed grasses over 12" tall within 10 feet of the structure; especially in front of windows, which are weak points in a structure.
- Occasional accents of woody plants can be used sparingly to soften hard edges of structures if the selections are widely spaced and zone appropriate.
- Consider locating hardscape features such as walkways, patios, driveways, sport courts etc. so they abut the structure itself. Potted plants can be used to soften walls if necessary.

Zone B (30'-100' from the edge of any qualifying structure)

- Zone B can be planted with a slightly higher density than Zone A. However, care should be taken not to create any horizontal or vertical fuel ladders.
- Screen plantings can be used to hide unsightly views. Hedging can be used provided the species
 of plant is acceptable and maintenance is performed regularly to minimize any accumulated
 leaf/twig litter.
- Zone B is the ideal location to introduce larger shade trees, provided they are zone appropriate and the canopies are not continuous.
- Avoid planting woody plant species larger than 2' at maturity directly beneath any tree canopy.

Zone C (100'-200' from the edge of any qualifying structure; may be necessary only if an "extra hazard" has been identified by fuel modification personnel)

- Although Zone C is often not landscaped on many projects, it may still be subject to hazard reduction requirements (brush clearance section 325.2.2 "extra hazard"). Do not denude the property. http://www.readyforwildfire.org/
- If Zone C is to be landscaped, avoid creating a landscape that is as dense and hazardous as the unmaintained vegetation.
- A good rule of thumb is to follow the same guidelines as Zones A and B with a slight increase in density.

Adjacent to Access Roads

- Maintain apparatus access roads with a 20' wide path that remains clear to the sky.
- Along roadsides, removal of cured annual grasses and weeds is required to be performed annually. Only well maintained and irrigated plants are allowed provided they do not hinder fire apparatus access.

Basic Fire Behavior – Fuel Ladders

Before selecting and locating plants on a Fuel Modification plan a basic understanding of wildland fire behavior is the key factor in properly arranging plants. Eliminating and avoiding the creation of fuel ladders should be the main focus. Understanding that anything planted in the landscape can become receptive fuel for wildfire and the way in which it is arranged and maintained will greatly influence the intensity of the fire. The following diagrams will aide in arranging appropriate plant compositions.

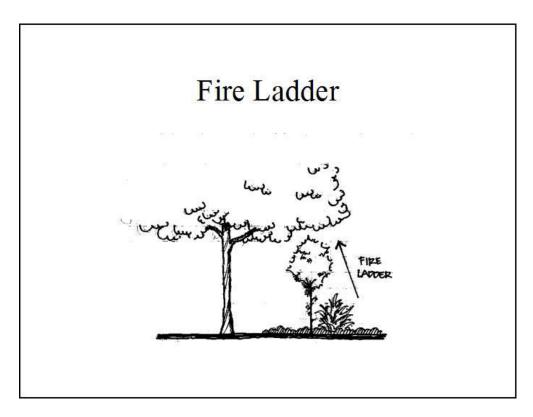


Figure 1: Fire Ladders or Fuel Ladders should be eliminated. The diagram above illustrates $\underline{\text{what } \text{not to}}$ $\underline{\text{do}}$.

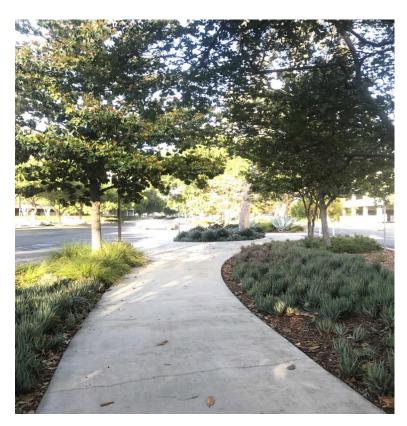


Figure 2: The concept of fuel ladders is crucial to planning a Fire-Wise landscape. No matter which plants are chosen, providing sufficient and defined separation between ground covers, shrubs and trees is the most crucial consideration in the design/plant-selection process. Do not use large shrubs or plants under tree canopies that may grow to a height greater than 2 feet at maturity. Pruning is not a long-term alternative to height appropriate plant selection.

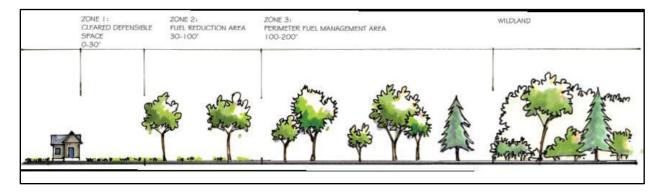


Figure 3: Note the progressive increase in density and arrangement moving away from the structure.

Plant Placement Do's

- Do use "mass plantings" of herbaceous/succulents as ground covers even if they are not traditionally used as such. If properly selected, mass plantings can eliminate fuel ladders.
- Do plant using spacing resulting in complete coverage at maturity, rather than hastening coverage with increased density (the only exception is manufactured slopes where quicker coverage is necessary in which case species selection is critical).
- Do consider using patio trees/un-sheared shrubs with an open habit as an informal screen in Zone A (Example: Toyon).
- Do consider vines as an alternative to hedges on walls or fences 10' from structures and unattached to structures.
- Do select varieties of plants that are slower growing and reach manageable sizes at maturity.
- Do use plants appropriately scaled to the size of the property and structure. E.g. a single story house does not need to be shaded by a 100' tall Sweetgum.

Plant Placement Don'ts

- Don't plant hedges directly against structures; this includes espaliers of large shrubs. Hedges taller than 6' and within 10' of the structure are not allowed.
- Don't plant large shrubs and trees in large masses in Zones A or B.
- Do not plant double hedge-rows.
- Don't plant at densities that result in an "instant landscape."
- Don't plant large plant species which would require pruning to reduce overall size.
- Don't plant vines on structures. Vines become receptive fuel beds for embers (fire brands).

- Don't assume any plant is "fire proof." All plants will burn and assuming a plant is ignition resistant can be very misleading.
- Don't use large woody species in mass plantings.

Acceptable Plant Selections for Fuel Modification

The plant list provided in the following pages is intended to be a *representative sample* of which types of plants are appropriate for each zone considering their size, moisture content, leaf litter production and chemical composition. This list is not a comprehensive list of plants available commercially. Designers may choose plants that are not on this list if the <u>plants physical characteristics are zone appropriate</u>. Selecting regionally appropriate plants, native species and the consideration of climate and microclimate adaptability is the responsibility of the designer.

Important note: This list is **not** a "pre-approved" list. Any plant listed as appropriate within the designated zone at a designated distance from a structure must still follow restrictions based on the density and arrangement principles stated **above**. Planting densities may be requested to be reduced and plant selections may be asked to be removed when placed inappropriately.

Sample Fuel Modification Plant List			
Botanical Name	Common Name	Zone	Minimum distance from structure
Constant Constant			
Ground Cover			
Acacia redolens 'Desert Carpet'/'Low Boy'	Desert Carpet Acacia	В	30
Achillea tomentosa	Woolly Yarrow	Α	
Ajuga reptans	Carpet Bugle	Α	
Arctostaphylos (Prostrate Varieties)	Manzanita	В	
Artemisia californica (Cultivars)	Sagebrush - Prostrate Forms	В	30
Artemesia 'Powis Castle'	NCN	В	
Baccharis pilularis 'Pigeon Point'/'Twin Peaks'	Prostrate Coyote Brush	В	
Campanula poscharkyana	Serbian Bellflower	Α	
Ceanothus gloriosus	Point Reyes Ceanothus	В	
Cerastium tomentosum	Snow-In-Summer	А	·
Chamaemelum nobile	Chamomile	А	
Cistus salviifolius 'Prostratus'	Sageleaf Rockrose	В	
Coprosma kirkii	Mirror Plant	В	
Coreopsis auriculata 'Nana'	Tickseed	А	
Cotoneaster (Prostrate Varieties)	Cotoneaster	В	

Dalea greggii	Trailing Indigo Bush	В	
Delosperma alba	White Training Ice Plant	Α	
Dichondra micrantha	Dichondra	Α	
Drosanthemum floribundum	Rosea Ice Plant	Α	
Duchesnea indica	Indian Mock Strawberry	Α	
Dymondia margaretae	NCN	Α	
Erigeron glaucus	Seaside Daisy	Α	
E. karvinskianus	Santa Barbara Daisy	В	
Euonymus fortunei 'Colorata'	Purple-Leaf Winter Creeper	В	
Festuca cinerea(ovina'Glauca')	Blue Fescue	Α	
F. rubra	Red Fescue	Α	
Fragaria chiloensis	Wild Strawberrry	Α	
Gazania Hybrids	Trailing Gazania	Α	
Geranium incanum/sanguineum	Cranesbill	Α	
Glechoma hederacea	Ground Ivy	Α	
Helianthemum nummularium	Sunrose	Α	
Herniaria glabra	Green Carpet	Α	
Heuchera species and Cultivars	Coral Bells	Α	
Hypericum calycinum/coris	Aaron's Beard	В	
Iberis sempervirens	Evergreen Candytuft	Α	
Iva hayesiana	Poverty Weed	В	30
Juniperus (Prostrate species/cultivars)		В	
Laurentia fluviatilis	Blue Star Creeper	Α	
Lysimachia nummularia	Moneywort	Α	
Liriope spicata	Creeping Lily Turf	Α	
Liriope muscari	Lily Turf	Α	
Mahonia repens	Creeping Mahonia	В	
Myoporum 'Pacificum' & 'Putah Creek'	Pacific Myoporum	В	
M. parvifolium	NCN	Α	
Oenothera berlandieri	Mexican Evening Primrose	В	
O. stubbei	Baja Evening Primrose	Α	
Ophiopogon japonicus	Mondo Grass	Α	
Pachysandra terminalis	Japanese Spurge	Α	
Pelargonium peltatum/tomentosum	Ivy Geranium	Α	
Persicaria capitata	Pink Clover	Α	
Phlox subulata	Moss Pink	Α	10
Phyla nodiflora (Lippia repens)	Lippia	Α	
Potentilla tabernaemontanii	Spring Cinquefoil	Α	
Ribes viburnifolium	Catalina Perfume	В	
Rosmarinus officinalis (Prostrate Varieties)	Prostrate Rosemary	В	30
Scaevola 'Mauve Clusters'	NCN	A	
Salvia sonomensis	Creeping Sage	В	

Sedum species	Stonecrops	Α	
Senecio mandraliscae/serpens	Kleinia/Blue Chalksticks	Α	
Soleirolia soleirolii	Baby's Tears	Α	
Teucrium cossonii majoricum	Germander	Α	
T. X lucidrys 'Prostratum'	Prostrate Germander	Α	
Thymus species	Mother of Thyme	Α	
Trachelospermum jasminoides	Star Jasmine	Α	
Trifolium fragiferum	White Clover	Α	
Verbena species (Prostrate Varities)	Garden Verbena	Α	
Vinca minor	Dwarf Periwinkle	А	
Viola odorata	Sweet Violet	Α	
Wedelia trilobata	Yellow Dot	В	
Zoysia tenuifolia	Korean Grass	А	
Miscellaneous Perennials, Grasses, Ferr	ns etc.		
Acorous gramineous and Cultivars	Sweet Flag	A	
Agapanthus africanus	Lily of the Nile	A	
Alstroemeria cooperi	Peruvian Lily	A	
Armeria species	Thrifts	A	
Bouetella gracillis	Blue Gramma	A	10
Bergenia cordifolia	Heart Leaf Bergenia	A	
Cycas species	Cycads	A	
Cyrtomium falcatum	Holly Fern	A	
Davalia tricomanoides	Rabbits Foot Fern	A	
Epilobium canum	California Fuchia	В	
Helictotrichon sempervirens	Blue Oat Grass	A	15
Hemerocallis hybrids	Daylily	A	
Iris douglassiana	Coastal Iris	A	
Iris germanica	Bearded Iris	A	
Kalanchoe species	Kalanchoe	A	
Leymus condensatus 'Canyon Prince'	Canyon Prince Wild Rye	A	20
Lobelia laxiflora	25, 25 1	A	15
Pelargonium species	Geranium	A	-
Penstemon species	Beard Tongue	A	
Plumeria	Plumeria	A	
Phlebodium aureum	Rabbits Foot Fern	A	
Tulbaghia violacea	Society Garlic	A	
Zephyranthes candida	Zephyr Lily	A	
Shrubs			

Abelia grandiflora (Prostrata)	Glossy Abelia	А	10
Abutilon hybridum	Flowering Maple	Α	10
Acanthus mollis	Bear's Breech	Α	
Agave species	Agave	А	
Aloe species	Aloe	Α	
Alyogyne huegelii	Blue Hibiscus	Α	10
Arbutus unedo (Dwarf Cultivars)	Dwarf Strawberry Tree	Α	10
Arctostaphylos species	Manzanita	В	
Aucuba japonica	Japanese Aucuba	Α	
Baccharis species	Various	В	
Berberis thunbergii	Japanese Barberry	В	
B. thunbergii ' prostrate cultivars'		Α	10
Bougainvillea sp.	Bougainvillea	В	
Buddleja davidii	Butterfly Bush	В	
Buxus microphylla japonica	Japanese Boxwood	А	10
Caesalpinia (Shrub Forms)	Bird of Paradise Bush	Α	10
Camellia species	Camellia	Α	10
Calliandra californica/eriophylla	Baja Fairy Duster	В	
Callistemon citrinus	Lemon Bottlebrush	В	
C. viminalis "Little John"	NCN	А	10
Calycanthus occidentalis	Western Spice Bush	В	
Carissa macrocarpa and Cultivars	Natal Plum	Α	10
Carpenteria californica	Bush Anemone	А	10
Cassia artemisioides	Feathery Cassia	А	30
Ceanothus species	Wild Lilac	В	30
Cercocarpus betuiloides	Mountain Mahogany	В	30
Choisya ternata	Mexican orange	В	
Cistus species	Rockrose	В	
Comarostaphylis diversifolia	Summer Holly	В	
Convolvulus cneorum	Bush Morning Glory	В	
Coprosma pumila/repens	Mirror Plant	В	
Cotoneaster species & cultivars	Cotoneaster	В	
Crassula species	NCN	А	
Cuphea hyssopifolia	False Heather	А	10
Cycas revoluta	Sago Palm	А	
Dasylirion quadrangulatum/wheeleri	Mexican Grass Tree	А	10
Dendromecon harfordii	Island Bush Poppy	В	
Dietes bicolor/irioides	Fortnight Lily	А	
Dodonaea viscosa (Purpurea)	Hopseed Bush	В	
Elaeagnus pungens & cultivars	Silverberry	В	

Encelia californica	Coast Sunflower	В	
E. farinosa	Brittle Bush	В	
Erigonum giganteum	St. Catherine's Lace	В	
Escallonia species	Escallonia	Α	10
Euonymus japonica & cultivars	Evergreen Euonymus	Α	10
Euphorbia species		Α	
Euryops pectinatus	NCN	Α	
Fatsia japonica	Japanese Aralia	Α	
Fouquieria splendens	Ocotillo	Α	
Fremontodendron species & cultivars	Flannel Bush	В	
Gardenia jasminoides	Gardenia	Α	
Garrya elliptica	Coast Silktassel	В	
Grevillea species & cultivars	Grevillea	В	
Grewia occidentalis	Lavender Starflower	В	
Hakea suaveolens	Sweet Hakea	В	
Hebe species & cultivars	Hebe	Α	10
Hesperaloe parviflora	Red Yucca	Α	
Hibiscus rosa - sinensis	Chinese Hibiscus	Α	10
llex species	Holly	В	
Juniperus species	Juniper	В	
Justicia brandegeana	Shrimp Plant	Α	10
J. californica	Chuparosa	В	
Keckiella cordifolia	Heart-Leaved Penstemon	В	
Kniphofia uvaria	Red-Hot Poker	Α	
Lantana Camara & hybrids	Lantana	Α	10
Larrea tridentata	Creosote Bush	В	
Lavandula species	Lavender	Α	10
Lavatera assurgentiflora/maritima	California Tree Mallow	В	
Leonotis leonrus	Lion's Tail	В	
Leptospermum scoparium & varities	New Zealand Tea Tree	В	
Leucophyllum species		В	
Ligustrum japonicum	Wax-leaf Privet	Α	10
Lupinus species	Lupine	В	
Mahonia aquifolium ('Compacta')	Oregon Grape	Α	10
M. fremontii	Desert Mahonia	В	
M. 'Golden Abundance'	NCN	В	
M. lomariifolia	Venetian Blind Mahonia	Α	
Malosma - See Rhus			
Malva species	Mallow	Α	10
Melaleuca nesophila	Pink Melaleuca	Α	10
Mimulus species (Diplacus)	Monkey Flower	Α	10

Myrica californica	Pacific Wax Myrtle	В	
Myrsine africana	African Boxwood	Α	10
Myrtus communis 'Compacta'	Dwarf Myrtle	А	10
Nandina domestica (including dwarf varieties)	Heavenly Bamboo	А	
Nerium oleander	Oleander	В	
N.o. 'Petite Salmon'	NCN	Α	10
Opuntia species	Prickly Pear, Cholla etc.	Α	
Phlomis fruticosa	Jerusalem Sage	Α	
Phoenix roebelenii	Pygmy Date Palm	В	50
Phormium tenax and Cultivars	New Zealand Flax	Α	
Photinia fraseri	Photinia	В	
Pittosporum tobira ('Variegata')	Tobira	В	
P.t.'Wheeler's Dwarf'	Dwarf Pittosporum	Α	
Punica granatum 'Nana'	Dwarf Pomegranate	А	10
Prunus ilicifolia	Hollyleaf Cherry	В	
Pyracantha species	Firethorn	В	
Rhamnus california/crocea	Coffeeberry	В	
Rhaphiolepis indica and Cultivars	India Hawthorn	Α	10
Rhus integrifolia/laurina	Lemonade Berry	В	40
R. ovata	Sugar Bush	В	30
Ribes species	Currant/Gooseberry	Α	10
Romneya coulteri	Matilija Poppy	В	
Rosa species (except R. californica)	Rose	Α	
Rosmarinus officinalis & cultivars	Rosemary	В	
Salvia species - native varieties	Sage	В	
S. greggii/leucantha	Autumn Sage	Α	10
Santolina chamaecyparissus/rosmarinifolius	Lavender Cotton	Α	10
Simmondsia chinensis	Jojoba	В	
Strelitzia nicolai/regina	Bird of Paradise	Α	
Tagetes lemmonii	Copper Canyon Daisy	В	
Tibouchina urvilleana	Princess Flower	Α	10
Trichostema lanatum	Wooly Blue Curls	В	
Viburnum species	Viburnum	Α	10
Westringia fruticosa	Coast Rosemary	Α	10
Xylosma congestum	Shiny Xylosma	В	
X.c. 'Compacta'	Compact Xylosma	Α	10
Yucca species	Yucca	В	
Trees			
Acacia farnesiana	Sweet Acacia	Α	15

A. greggii	Catclaw Acacia	В	
A. salicina	Willow Acacia	Α	15
A. smallii	NCN	Α	15
A. stenophylla	Shoestring Acacia	Α	15
Acer negundo	Box Elder	В	
A. palmatum	Japanese Maple	Α	
A. saccharinum	Silver Maple	В	40
Aesculus californica	California Buckeye	В	
Agonis flexuosa	Peppermint Tree	В	
Albizia julibrissin	Silk Tree	В	
Alnus rhombifolia	Alder	В	
Arbutus unedo ('Marina')	Strawberry Tree	Α	15
Archontophoenix cunninghamiana	King Palm	30	
Bauhinia variegata	Purple Orchid Tree	В	
Betula pendula	European White Birch	А	15
Brachychiton acerifolius/populneus	Flame Tree/Bottle Tree	В	
Callistemon citrinus	Lemon Bottlebrush	В	
C. viminalis	Weeping Bottlebrush	А	15
Calocedrus decurrens	Incense Cedar	В	
Calodendrum capense	Cape Chestnut	В	
Cedrus deodara	Deodar Cedar	В	40
Ceratonia siliqua	Carob	В	30
Cercidium floridum/microphyllum	Blue Palo Verde	Α	
Cercis occidentalis/canadensis	Western Redbud	А	10
Chilopsis linearis	Desert Willow	А	15
Chionanthus retusus	Chinese Fringe Tree	А	10
Chitalpa X tashkentensis	Chitalpa	А	10
Chorisia speciosa	Floss Silk Tree	В	
Cinnamomum camphora	Camphor Tree	В	30
Citrus species	Citrus	А	10
Cocculus laurifolius	Laurel Leaf Snail Seed	В	
Cordyline australis	Giant Dracaena	А	
Cyathea cooperi	Australian Tree Fern	Α	
Dicksonia antarctica	Tazmanian Tree Fern	А	
Dracaena draco	Dragon Tree	А	
Eriobotrya deflexa/japonica	Bronze Loquat/Loquat	А	10
Erythrina species	Coral Tree	В	
Feijoa sellowiana	Pineapple Guava	А	10
Ficus species	Fig	В	50
Fraxinus species	Ash	В	30
Geijera parviflora	Australian Willow	Α	15

Ginkgo biloba	Maidenhair Tree	А	15
Gleditsia triacanthos	Honey Locust	A	15
Grevillea robusta	Silk Oak	В	
Heteromeles arbutifolia	Toyon	Α	15
Hymenosporum flavum	Sweetshade Tree	Α	15
Jacaranda mimosifolia	Jacaranda	В	
Juglans californica	Black Walnut	В	
Koelreuteria bipinnata/paniculata	Chinese Flame Tree	В	
Lagerstroemia indica	Crape Myrtle	Α	10
Laurus nobilis	Sweet Bay	В	
Leptospermum laevigatum	Australian Tea Tree	Α	15
Liquidambar formosana	Chinese Sweet Gum	Α	15
L. styraciflua	American Sweet Gum	В	
Liriodendron tulipfera	Tulip Tree	В	
Lithocarpus densiflorus	Tanbark Oak	В	
Lophpstemon confertus (Tristania)	Brisbane Box	А	15
Lyonothamnus floribundus	Catalina Ironwood	А	15
Magnolia grandiflora	Southern Magnolia	В	
M. X soulangeana	Saucer Magnolia	А	10
Maytenus boaria	Mayten Tree	А	10
Melaleuca quinquenervia	Cajeput Tree	Α	15
Metasequoia glypstroboides	Dawn Redwood	А	15
Metrosideros excelsus	New Zealand Christmas Tree	A	10
Morus alba	White Mulberry	В	
Olea europea	Olive - Fruitless only	Α	15
Parkinsonia aculeata	Jerusalem Thorn	Α	10
Pinus species	Pine	В	75
Pistacia chinensis	Chinese Pistache	В	
Pittosporum phillyraeoides	Willow Pittosporum	Α	10
P. rhombifolium	Queensland Pittosporum	В	
Platanus racemosa	California Sycamore	В	
Podocarpus gracilior/macrophyllus	Fern Pine/Yew Pine	В	
Populus fremontii	Fremont Cottonwood	В	50
Prosopis chilensis	Chilean Mesquite	В	
P. glandulosa	Honey Mesquite	А	15
Prunus cerasifera 'Atropurpurea'	Purple-leaf Plum	Α	10
Punica granatum	Pomegranate	В	
Pyrus calleryana/kawakamii	Ornamental Pear	А	15
Quercus species	Oak	В	30
Rhus lancea	African Sumac	В	
Robinia ambigua	Locust	В	

Sapium sebiferum	Chinese Tallow Tree	В	
Schefflera actinophylla	Queensland Unbrella Tree	Α	
Sophora japonica	Japanese Pagoda Tree	В	
Stenocarpus sinuatus	Firewheel Tree	Α	10
Tabebuia species	Trumpet Tree	Α	15
Tipuana tipu	Tipu Tree	В	
Tupidanthus calyptratus	Tupidanthus	Α	
Umbellularia californica	California Bay	В	
Zelkova serrata	Sawleaf Zelkova	В	