A contribution to creating groups of trees for forest valuation

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ABSTRACT: During the construction of model logging costs for valuation of forest stands, by accident I found out differences between some species included in the groups of tree species. Differences within the groups of species may cause errors in logging costs of some species, for example with hornbeam, all species of linden, all species of rowans and horse chestnut. With the help of simple calculations it was proved that the differences could be very large, that they were more than forty per cent, it means they were significant. On the basis of my further research it is envisaged to increase the number of groups of trees from 13 to 16. The purpose is to give the most accurate background to make up a model of logging costs. In the second step it is expected that the model can provide the results for more or fewer groups of trees more easily if statistical methods are used. But this problem is not a part of this paper.

Keywords: hornbeam; linden; rowan; horse chestnut; logging costs; groups of trees species

For the establishment of the value *Au* (*Au* – value of major harvest at the end of rotation age) which was used as the basis for forest valuation, the calculation of logging costs was based on linear interpolation as no more detailed data were probably available. Another possibility how to use logging costs are some calculation procedures for the determination of damage to forest crops according to currently valid Regulation No. 55/1999. The analysis of enumerative data proved that by using identical qualities that are used for forest valuation it is possible to create to logging costs more accurate and more appropriate for individual combinations age and height of trees for all 13 groups of trees. Thus the calculation of logging costs would get much closer to the real growth dynamics of particular tree species. The expected simplification of calculation method could be a secondary but not less important result of this work.

Carrying out preparatory works I incidentally found out that there were some deviations from common tree species classification into the groups according to their growth, technical, technological or operational characteristics. For example, the hornbeam is deduced from the beech for forest valuation, but for the yield determination (according to Schwappach mass tables and mensurational [yield] tables of Forest Management Institute in Brandýs nad Labem) – according to Černý et al. (1994) – it is deduced as a separate tree species. Birch ranks among soft-wooded broadleaves for the determination of time consumption standard, but in the technical tables it belongs to hardwood broadleaves. Lime is deduced from beech for yield determination, for the purposes of logging and skidding it has, however, to be considered as a soft-wooded broadleaved tree. These differences affect logging costs.

These facts made me avoid a schematic approach and be careful with taking the achieved results and procedures for definite. When calculating model logging costs, I decided to carry out careful analysis of the creating of groups of trees. I created a comparison table where all tree species listed in forest operational units (Forests of the Czech Republic in Hradec Králové, joint stock companies, private or corporate forest farms) were introduced as separate

Table 1. The classification of particular species into the groups of trees

Mark	Reason for the creating of the group of trees	Tree species	Specification No. I.	Specification No. II.
SD1	For the deducting of time consumption for cutting	SM		all kinds of genus *Picea* and *Abies*, *Pseudotsuga*
		BO		all kinds of genus *Pinus* and *Larix, Taxus, Juniperus* and the other conifers
		BK		all kinds of hard-wooded deciduous trees except genus *Betula* and *Sorbus*
		BR		all kinds of soft-wooded deciduous trees with genus *Betula* and *Sorbus*
SD2	For the determining of growth stage for cutting	SM	9 site classes	all kinds of trees except two following lines
		DG	5 site classes	*Pseudotsuga* and all kinds of *Alnus*
		BR	3 site classes	all kinds of genus *Betula, Fraxinus, Sorbus* and *Populus tremula* and *Ailanthus altissima*
SD3	For calculation of middle tree mass of trees (by firm Topolrpo)	SM		all kinds of genus *Picea*
		JD		all kinds of genus *Abies*
		BO		all kinds of genus *Pinus, Taxus, Juniperus* and all other COF
		MD		all kinds of genus *Larix*
		DG		*Pseudotsuga*
		BK		*Fagus sylvatica*, all kinds of genus *Acer, Tilia* and *Aesculus hipocastanum*
		DB		all kinds of genus *Quercus, Ulmus, Platanus, Malus, Pyrus* and *Juglans regia* and *nigra*, and the other HWDT
		JS		all kinds of genus *Fraxinus* and *Ailanthus*
		OL		all kinds of genus *Alnus* and *Castanea*
		HB		*Carpinus betulus*
		AK		*Robinia pseudoacacia*
		TP		all kinds of genus *Populus* and *Salix*
		BR		all kinds of genus *Betula* and *Sorbus*
SD4	For the determining of middle tree mass for skidding	SM		all kinds of genus *Picea* and *Abies*, *Pseudotsuga*
		BO		all kinds of genus *Pinus* and *Larix, Taxus, Juniperus* and the other COF
		BK		*Fagus sylvatica,* all kinds of genus *Acer, Fraxinus, Ulmus, Sorbus, Juglans, Robinia, Prunus, Malus, Pirus, Chestnut, Platanus, Ailanthus* and the other HWDT
		HB		*Carpinus betulus*
		BR		all kinds of genus *Betula, Tilia, Alnus* and *Populus tremula* and the other SWDT
		TP		all kinds of genus *Populus* (except *P. tremula*) and *Salix*

Table 1 to be continued

Mark	Reason for the creating of the group of trees	Tree species	Specification No. I.	Specification No. II.
		SM		all kinds of genus *Picea* and *Abies, Pseudotsuga*
SD5	For the determining of time consumption for skidding	BO		all kinds of genus *Pinus, Larix, Taxus, Juniperus* and the other COF and SWDT
		BK		all kinds of HWDT
		SM		all kinds of genus *Picea*
		JD		all kinds of genus *Abies*
		BO		all kinds of genus *Pinus, Taxus, Juniperus* and all other COF
		MD		all kinds of genus *Larix*
		DG		*Pseudotsuga*
		BK		*Fagus sylvatica, Carpinus betulus,* all kinds of genus *Acer, Tilia, Aesculus*
SD6	For forest valuation	DB		all kinds of genus *Quercus, Ulmus, Platanus, Malus, Pyrus* and *Juglans regia* and *nigra,* and the other HWDT
		JS		all kinds of genus *Fraxinus* and *Ailanthus*
		OL		all kinds of genus *Alnus* and *Castanea*
		OS		*Populus tremula*
		AK		*Robinia pseudoacacia*
		TP		all kinds of genus *Populus* (except *P. tremula*) and *Salix*
		BR		all kinds of genus *Betula* and *Sorbus*

COF – other conifers

HWDT – other hard-wooded deciduous trees

SWDT – other soft-wooded deciduous trees species which occur in the stands of the Czech Republic and I analysed them.

MATERIAL

Particular tree species are classified into groups of trees according to needs:

- for the calculation of middle tree mass (the official basis for the calculation in forest management tables opened to the public by Forest Management Institute in Brandýs nad Labem) 13 groups of trees are used,
- for forest valuation 13 groups of trees are distinguished as well (Property Assessment Regulation No. 540/2002), but they do not correspond to the preceding ones,
- for the deduction of growth stage for cutting, tree species are divided into 3 types according to the number of site classes as follows: spruce (9 stages), Douglas fir (5 stages) and birch (3 stages). The growth stage is an important characteristic that substantially (about 20%) affects cutting costs even with the same tree species and average cutting tree mass,
- to determine the standard of time consumption for cutting, 4 type species are used (spruce, pine, beech and birch),
- to determine the rate of output for skidding, 3 type species are used (spruce, pine, and beech),
- for deduction of average tree mass for skidding, 6 type species are used (spruce, pine, beech, hornbeam, birch and poplar).

Table 1 shows a detailed description of species classification into the groups, according to particular types. In Table 2 all species that can be found (even if only theoretically) in the stands of the Czech Republic are introduced. They are listed and sorted in alphabetic order so that their coincidence according to tree species criteria could be compared.

There are 80 species listed but it need not be the total number because smaller groups of trees with similar characteristics are also included (for example other coniferous trees, other soft-wooded broadleaved trees or other hard-wooded broadleaved trees, all clones of poplar, etc.). Out of 80 species there are 8 tree species (i.e. 10%) that by grading in tree types show differences from the model applied so far to law-making for forest valuation.

METHODS

It is obvious from Table 2 that most species (about 90 per cent) can be graded in 6 groups of trees without problems. Only hornbeam, all limes, rowans and horse chestnut differ from the groups of trees they are assigned to for valuation.

The measure of difference varies with particular species.

Hornbeam

Its group of trees for forest valuation is beech, but hornbeam differs from beech in group number 3 (for determination of middle tree mass for cutting, which is very important) and in group number 4 for derivation of middle tree mass for skidding.

Lime

All species of lime differ from beech. It is its type group of trees for forest valuation. Limes differ from beech even in three groups of trees: in group number 1 (for determination of time consumption for cutting), in group number 5 (for determination of time consumption for skidding) because as opposed to beech lime is a soft-wooded broadleaved tree, and in group number 4 for deducting the middle tree mass for skidding because it has another type of branching.

Rowan

The group of tree species for forest valuation is birch, but all rowans differ from birch in two groups: in group 4 (for deducting the middle tree mass for skidding where their grading comports with beech) and in group number 5 (for deducting the time consumption for skidding) where rowans are considered as soft-wooded broadleaves and correspond therefore to the type of spruce.

Horse chestnut

It differs from beech (which is its type group of trees for forest valuation) similarly like lime, but in two types only. First, in group number 1 (determination of time consumption for cutting), second in group 5 (for deducting the time consumption for skidding) because as opposed to beech, chestnut is a soft-wooded broadleaved tree both for cutting and skidding.

As the differences become evident solely in the case of grading the species in groups of trees that determine the time consumption for cutting and skidding, it is not possible to ignore their economic impact. We must try to determine the level of deviation from the type group of trees, in other words it is important to determine if it is necessary to take the differences into consideration.

RESULTS

With the help of accidentally chosen calculations we can assess how much the above-mentioned facts affect the calculation of logging costs because they

Table 2. The classification of particular species to the groups of trees

No.	Species in Latin	Species	Group of trees	DT1	DT2	DT3	DT4	DT5	DT6	No.	Species in Latin	Species	Group of trees	DT1	DT2	DT3	DT4	DT5	DT6
63	*Robinia pseudoacacia*	AK	AK	BK	SM	AK	BK	BK	AK	40	*Quercus robur*	DB		BK	SM	DB	BK	BK	DB
51	*Carpinus betulus*	HB	HB	BK	SM	**HB**	**HB**	BK	BK	41	*Quercus*	DBS		BK	SM	DB	BK	BK	DB
50	*Fagus sylvatica*	BK		BK	SM	BK	BK	BK	BK	42	*Quercus petraea*	DBZ		BK	SM	DB	BK	BK	DB
52	*Acer platanoides*	JV		BK	SM	BK	BK	BK	BK	43	*Quercus rubra*	DBC		BK	SM	DB	BK	BK	DB
53	*Acer pseudoplatanus*	KL	BK	BK	SM	BK	BK	BK	BK	44	*Quercus pubescens*	DBP		BK	SM	DB	BK	BK	DB
54	*Acer campestre*	BB		BK	SM	BK	BK	BK	BK	45	*Quercus alba*	DBB		BK	SM	DB	BK	BK	DB
55	*Acer negundo*	JVJ		BK	SM	BK	BK	BK	BK	47	The other *Quercus*	DBX		BK	SM	DB	BK	BK	DB
56	The other *Acer*	JVX		BK	SM	BK	BK	BK	BK	48	*Quercus cerris*	CER		BK	SM	DB	BK	BK	DB
80	*Tilia cordata*	LP		BR	SM	BK	**BR**	**SM**	**BK**	60	*Ulmus montana*	JL		BK	SM	DB	BK	BK	DB
81	*Tilia platyphyllos*	LPV	LP	BR	SM	BK	**BR**	**SM**	**BK**	61	*Ulmus scabra*	JLD	DB	BK	SM	DB	BK	BK	DB
82	*Tilia tomentosa*	LPP		BR	SM	BK	**BR**	**SM**	**BK**	62	*Ulmus laevis*	JLV		BK	SM	DB	BK	BK	DB
93	*Aescullus hypocastanum*	KS		BR	SM	BK	**BK**	**SM**	**BK**	70	*Juglans regia*	OR		BK	SM	DB	BK	BK	DB
20	*Pinus sylvestris*	BO		BO	SM	BO	BO	BO	BO	71	*Juglans nigra*	ORC		BK	SM	DB	BK	BK	DB
21	*Pinus nigra*	BOC		BO	SM	BO	BO	BO	BO	72	*Platanus aceroides*	PL		BK	SM	DB	BK	BK	DB
22	*Pinus banksiana*	BKS		BO	SM	BO	BO	BO	BO	74	*Prunus avium*	TR		BK	SM	DB	BK	BK	DB
23	*Pinus strobus*	VJ		BO	SM	BO	BO	BO	BO	75	*Prunus padus*	STR		BK	SM	DB	BK	BK	DB
24	*Pinus cembra*	LMB		BO	SM	BO	BO	BO	BO	76	*Pirus malus*	HR		BK	SM	DB	BK	BK	DB
25	*Pinus maritima*	BOM	BO	BO	SM	BO	BO	BO	BO	77	*Malus communis*	JB		BK	SM	DB	BK	BK	DB
27	The other *Pinus*	BOX		BO	SM	BO	BO	BO	BO	79	The other HWDT	LTX		BK	SM	DB	BK	BK	DB
28	*Pinus mugo*	KOS		BO	SM	BO	BO	BO	BO	57	*Fraxinus excelsior*	JS		BK	BR	JS	BK	BK	JS
29	*Pinus rotundata*	BL		BO	SM	BO	BO	BO	BO	58	*Fraxinus americana*	JSA	JS	BK	BR	JS	BK	BK	JS
33	*Taxus baccata*	TS		BO	SM	BO	BO	BO	BO	59	The other *Fraxinus*	JSX		BK	BR	JS	BK	BK	JS
35	*Juniperus communis*	JAL		BO	SM	BO	BO	BO	BO	95	*Ailanthus altissima*	PJ		BR	SM	JS	BK	SM	JS
39	The other *conifers*	JX		BO	SM	BO	BO	BO	BO	83	*Alnus glutinosa*	OL		BR	DG	OL	BR	SM	OL
30	*Larix decidua*	MD	MD	BO	SM	MD	BO	BO	BO	84	*Alnus incana*	OLS	OL	BR	DG	OL	BR	SM	OL
31	The other *Larix*	MDX		BO	SM	MD	BO	BO	BO	85	*Alnus viridis*	OLZ		BR	DG	OL	BR	SM	OL
64	*Betula verrucosa*	BR	BR	BR	BR	BR	BR	BK	BR	94	*Castanea sativa*	KJ		BR	DG	OL	BR	SM	OL
65	The other *Betula*	BRX		BR	BR	BR	BR	BK	BR	86	*Populus tremula*	OS	OS	BR	BR	TP	BR	SM	OS

Table 2 to be continued

66	*Sorbus aucuparia*	JR		BR	BR	BR	**BK**	**BO**	BR	1	*Picea abies*	SM		SM	SM	SM	SM	SM	SM
67	*Sorbus torminalis*	BRK	JR	BR	BR	BR	**BK**	**BO**	BR	2	*Picea pungens*	SMP		SM	SM	SM	SM	SM	SM
68	*Sorbus aria*	MK		BR	BR	BR	**BK**	**BO**	BR	3	*Picea mariana*	SMC		SM	SM	SM	SM	SM	SM
18	*Pseudotsuga taxifolia*	DG	DG	SM	DG	DG	SM	SM	DG	4	*Picea spinulosa*	SMS	SM	SM	SM	SM	SM	SM	SM
10	*Abies alba*	JD		SM	SM	JD	SM	SM	JD	5	*Picea omorica*	SMO		SM	SM	SM	SM	SM	SM
11	*Abies grandis*	JDO		SM	SM	JD	SM	SM	JD	6	*Picea engelmanii*	SME		SM	SM	SM	SM	SM	SM
12	*Abies concolor*	JDJ	JD	SM	SM	JD	SM	SM	JD	9	The other *Picea*	SMX		SM	SM	SM	SM	SM	SM
13	*Abies koreiana*	JDK		SM	SM	JD	SM	SM	JD	87	*Populus balsamifera*	TP		BR	SM	TP	TP	SM	TP
14	*Abies Veitchii*	JDV		SM	SM	JD	SM	SM	JD	88	*Populus nigra*	TPC		BR	SM	TP	TP	SM	TP
16	The other *Abies*	JDX		SM	SM	JD	SM	SM	JD	89	The other *Populus*	TPX		BR	SM	TP	TP	SM	TP
										90	Cultivated *Populus*	TPS	TP	BR	SM	TP	TP	SM	TP
										91	*Salix caprea*	JIV		BR	SM	TP	TP	SM	TP
										92	*Salix alba*	VR		BR	SM	TP	TP	SM	TP
										97	The other SWDT	LMX		BR	SM	TP	BR	SM	TP

influence the calculation of final yield value (A_u) and of age value factor (f_a). I present a simple comparison of direct logging costs that were calculated in the same technical, field and climatic conditions.

Tables 3 and 4 show direct costs of cutting and skidding (it was calculated according to Hindls et al. 1999). Table 3 compares direct costs of cutting between the species beech and hornbeam and Table 4 shows differences in direct costs of skidding between the species beech and lime. To make the comparison relevant and as objective as possible, we compared the values at equal age and tree height of these species. These two examples were chosen because both species (hornbeam and lime) are calculated equally for the determination of final yield value – from beech. Even a common assessment proves that the differences are very sharp, as we can see from the indices of values for particular species that reach tens of per cents. On the basis of these results we can say that all 16 groups of trees must be considered for the calculation of average cost value.

Causes of differences and calculation analysis

The reasons for cost value differences are not unified. Different values of costs between beech and hornbeam are mainly caused because:

a) both of these two species have main growth dynamics at different age. The same values of the tree height in relation to the same age result from the fact that in beech the value reflects the bad growth caused by low site class, low genetic quality or specimen vitality as opposed to high value site class in hornbeam;
b) differences in logging costs between equally characterized specimens of both species will rise with age;
c) the fact that both species are hard-wooded broadleaves and have 9 site classes affects the differences in logging costs least of all;
d) the supposed differences in skidding costs are caused by richer branching of hornbeam, which means that from one tree more pieces arise which must be put together for skidding.

The reasons for different skidding cost values between beech and lime are caused:

a) equally chosen values of tree height and age were compared. The groups of trees were not selected, they resulted from comparison according to groups of trees. In order to provide for maximum objectivity I chose the same technology of skidding, the same starting costs of one-hour-operation (240 CZK) and the same skidding distance (500 m);

Table 3. Comparison of logging costs

Age	Height (m)	Cutting of beech						Cutting of hornbeam						Index of costs
		AHS	RSC	GS	MTM	NCoT	K for cm	AHS	RSC	GS	MTM	NCoT	K for cm	
55	15	22	5	2	0.11	1.21	145	18	5	2	0.14	1.21	145	1.000
	17	24	4	2	0.15	0.96	115	20	3	2	0.18	0.96	115	1.000
	19	26	3	2	0.19	0.96	115	22	2	1	0.24	0.70	84	1.371
90	16	16	8	3	0.25	0.87	104	16	6	2	0.40	0.59	71	1.475
	18	18	7	3	0.32	0.81	97	18	5	2	0.55	0.53	64	1.528
	20	20	6	2	0.41	0.59	71	20	3	2	0.74	0.46	55	1.283
110	16	16	9	3	0.32	0.81	97	16	6	2	0.53	0.53	64	1.528
	18	18	8	3	0.44	0.71	85	18	5	2	0.75	0.46	55	1.543
	20	20	7	3	0.58	0.63	76	20	3	2	1.03	0.40	48	1.575

AHS – absolute height site class
RSC – relative site class (according to Schwappach and others)
GS – growth stage
MTM – middle tree mass
NcoT – norm consumption of time per one calculation unit for the cutting
K for cm – costs in Czech crowns per one cubic meter
Conditions of the calculation of costs
1. Both species are cut by chain saw with costs of 120 crowns per one hour
2. For both cases simple consumption of time excluding surcharge was used
3. Both species are of the same age and height of cut tree
4. Costs are calculated on the direct cost level

b) as the most serious cause of different logging costs appears the fact that norm consumption of time in lime is deduced from conifers while beech ranks among hard-wooded broadleaves. It means that specific time consumption for hard-wooded broadleaves is by 30 or 40 per cent higher (it was calculates according to Chajdiak et al. 1989) and corresponds to the final skidding costs ratio between beech and lime;
c) the less important reason for logging cost differences is different growth dynamics of lime compared with beech. It becomes evident in low middle tree mass of the cut tree with the same age and height of tree.

Consequences of differences

The described situation cannot be considered as a disaster but the fact that more than two per cent of all species are permanently assessed incorrectly is not desirable. The differences have relatively massive deviations as described in Tables 3 and 4. They reach values about 40 per cent and more. The impact of the differences is quite small from the national point of view, but the impacts on individual forest owners can be very perceptible in regions with broadleaved trees. As the cost valuation of forest property concerns mainly private owners, it is necessary to use this information for the calculation of A_u and f_a, which are the main factors to express the compulsory forest value.

CONCLUSION

The differences found out by analysis justify the opinion that the number of groups of trees should be enlarged from 13 to 17, or at least to 16. The extended number would include respective types hornbeam, lime, rowan and horse chestnut. The reason to omit the horse chestnut (considering 16 groups of trees) is the fact that from the economic point of view it is unimportant, its existence in forest crops is only on a theoretical level, and there is no need to create a new type for it. It can be assigned to the group of soft-wooded broadleaved trees which are represented by lime.

It is not popular to increase the number of groups of trees even under the circumstances when the negative impacts can be eliminated by use of computers. In my opinion it is, however, the right step allowing more accurate calculations. The objective could be to unify the cost charges in the smallest number of groups of trees but on the basis of more accurate calculations by means of good statistical methods. I assume that the described method is not only possible but also attainable. It cannot, however,

Table 4. Comparison of skidding costs

Age	Height (m)	Skidding of beech				Skidding of lime				Index of costs
		MTM1	MTM2	NCoT	K for cm	MTM1	MTM2	NCoT	K for cm	
55	15	0.14	0.08	0.74	178	0.11	0.08	0.55	132	1.345
	17	0.18	0.09	0.74	178	0.15	0.08	0.55	132	1.345
	19	0.24	0.13	0.74	178	0.19	0.10	0.51	122	1.451
90	16	0.40	0.20	0.56	134	0.25	0.15	0.39	94	1.436
	18	0.55	0.28	0.56	134	0.32	0.18	0.39	94	1.436
	20	0.74	0.33	0.42	101	0.41	0.20	0.29	70	1.448
110	16	0.53	0.24	0.42	101	0.32	0.18	0.39	94	1.077
	18	0.75	0.33	0.42	101	0.44	0.23	0.29	70	1.448
	20	1.03	0.33	0.42	101	0.58	0.28	0.29	70	1.448

MTM1 – middle tree mass for cutting
MTM2 – middle tree mass for skidding
NcoT – norm consumption of time per one calculation unit for skidding
K for cm – costs in Czech crowns per one cubic meter
Conditions of the calculation of costs

1. Both species are skidded by universal tractor with costs of 240 crowns per one hour
2. For both cases simple consumption of time excluding surcharge was used
3. Wood is skidded from the locality "stump" to the place for subsequent transport directly, skidding distance is 500 m
4. Both species are of the same age and height of cut tree
5. Costs are calculated on the direct cost level

be described here because the solution to this problem would make the work too extensive.

This paper signifies the trend and step sequence leading to the objective, in my opinion, positively. On the basis of stated facts I decided to work on the construction of model costs in future. It will partly enable to find out to what extent the used logging costs corresponding to particular values A_u and f_a conform to their growth dynamics and it will partly enable to make easier cost calculation for the determination of damage to forest crops (or crop destruction, thefts, etc.).

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Příspěvek k tvorbě skupin dřevin pro účely oceňování lesa

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ABSTRAKT: V průběhu konstrukce zjednodušení nákladového modelu pro oceňování lesních porostů byly náhodně zjištěny odchylky při zařazení některých dřevin do skupin dřevin. Rozdíly v zařazení dřevin do dřevinných typů působí následně rozdíly v nákladech na těžbu a soustřeďování dříví u habru, všech lip, jeřábů a kaštanu koňského. Za pomoci jednoduchých kalkulací bylo prokázáno, že odchylky nákladových sazeb mohou dosahovat až několika desítek procent. Na základě podrobného rozboru je navrženo rozšíření dosavadního počtu skupin dřevin ze 13 na 16, jejichž cílem je poskytnout co nejpřesnější podklady pro tvorbu kalkulací nákladů pro modelování A_u a f_a. V dalším kroku se pak očekává, že nákladový model může být za použití statistických metod významně zjednodušen (alespoň pro výkon soustřeďování dříví) na několik málo skupin dřevin. Řešení zjednodušení modelu však není obsahem práce.

Klíčová slova: habr; lípa; jeřáb; kaštan koňský; těžební náklady; skupiny dřevin

Z dostupných informací vyplývá, že pro kalkulaci těžebních nákladů při konstrukci dat použitých jako podklady v oceňování lesních porostů hodnoty A_u (hodnota mýtní výtěže ve věku obmýtí) a f_a (věkový hodnotový faktor ve věku a) bylo nutné využít lineární interpolace, protože podrobnější podklady pravděpodobně nebyly k dispozici. Analýzou jsem zjistil, že využitím shodných veličin, jaké se používají pro ocenění lesních porostů, lze vytvořit modelové náklady přesnější pro všech 13 dosud používaných skupin dřevin.

Při přípravných pracích jsem však náhodně objevil, že některé dřeviny (HB, LP, JR a KS) se od běžného zařazení dřevin do skupin podle jejich charakteristik výrazně liší. Kalkulací jsem zjistil, že rozdíly dosahují hodnot až kolem 50 %. Rozdíly zjištěné analýzou opravňují k názoru, že by bylo účelné rozšířit počet skupin dřevin pro účely oceňování lesa ze 13 na 16, tedy o samostatné typy: habr, lípa, jeřáb. Kaštan koňský (KS) je na rozdíl od ostatních uvedených dřevin z hospodářského hlediska bezvýznamný a jeho přítomnost v lesních porostech je spíš jen teoretická. To nevytváří potřebu tvořit pro něj samostatnou skupinu.

Jsem si vědom, že zvyšování počtu skupin dřevin není právě aktuální, avšak pro dobu akutní potřeby je prozíravé mít k dispozici nový model, protože umožňuje přesnější výpočty. Cílovým stavem by potom mohl být postup ke sjednocení nákladových sazeb do co nejnižšího počtu skupin dřevin, ale na základě přesnějších podkladových propočtů s využitím celé škály statistických metod. Mám za to (a moje další práce na této problematice o tom svědčí), že takový postup je nejen reálný, ale i dosažitelný, avšak nemůže být obsahem této práce. Zato však zde naznačuje směr a sled postupných kroků k cílovému stavu. Na základě zjištěných skutečností je možné v budoucnu pokračovat na tvorbě takových modelových nákladů, které umožní jednak prověřit, nakolik se dosud použité těžební náklady (odpovídající jednotlivým hodnotám A_u a f_a) shodují s objektivní růstovou dynamikou dřevin, jednak umožní usnadnit (případně i metodicky sjednotit) výpočet nákladů pro účely stanovení výše škod na lesních porostech (ekonomicky odůvodněné úplné vlastní náklady na těžbu a soustřeďování dříví).

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