M rl t tr t tr t t r t t tr
Af r t r r t

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A a

N tr tr f m t rt t r r t r m r l m l t t d f 2000 t l t f 2001. N t m r l t tr t rt r t m O rA r m l t ff r t m l r m t t t r r t m r m t m t m l t fr m r t r. N t rt t m t m l ($n = 30$) t r ff r tt m r l tt r : r t tr t t m m l NH_4^+ r m l t , r t tr t r NH_4^+ r m l t , m m l t tr t m rt NH_4^+ r m l t . 4- t rt t t r r r t f t t f t rt fr m t m t m l r t r ll r l t ($R^2 > 0.70$). C m t m l fr m t t t r t r t t t l t tr t m l t l t , r r t r t tr t . Gr m r l t tr t (2000 l) rt r t m t r t l t t Q . Gr rt f r t r m t t r r r l t l l . Gr rt f m r l t tr t f r t r t r l t t t l C/N r t , t r r r t r ll r r t r m t , *Acer saccharum* m t r - m t . m r f m t r r t t ll r m l r r r f t t l r t tt tt r f t r t tr r l t r f m l t r . Dff r t t t r t r l t t r t f l (C/N) t t (*A. saccharum* tr t) r t r t .

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Keywords: F r t l ; N m r l t ; N tr t ; C/N r t

1. I

A r t m r m t ff r t l N tr f m - t r t r f r r tr t l r t t m t t ff t f l t tr r t . R t t t t t rt t l tr r r t m r - l l f r t (M r t l., 1998; B r K ll, 2002; M r t l., 2002). r , t r l t t r tr r l l r t f r r tt r r t r Frr t E l r M r

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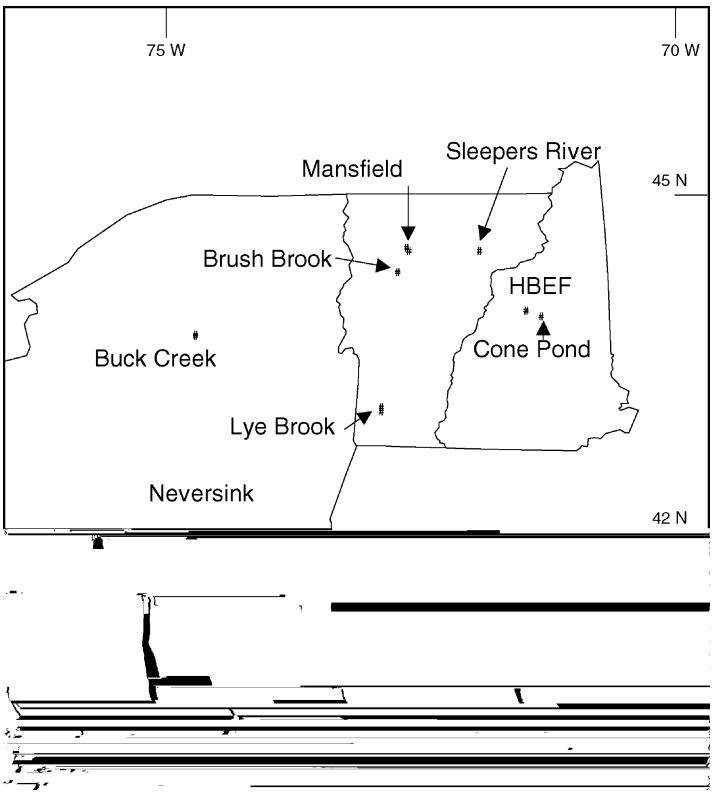
O r t l., 1999), l t (K ,
1998; B l t l., 2001), r t r t r
r t (G ll t l., 2001), tr (F
t l., 1998; K , 1998; B r r

l 1
C r t r t f t m l r t (t m tt r r t t 5 m r , f t m l r t)

t	L t	El t (m)	D m t t r
B r B r , D t r	44°18.22′N, 72°53.48′	710	*Betula alleghaniensis*, *A. saccharum*
B r B r , G t r	44°18.16′N, 72°53.53′	720	*B. alleghaniensis*, *A. saccharum*
B, C r , t t r	43°44.32′N, 74°42.60′	660	*F. grandifolia*, *B. alleghaniensis*
B, C r , t t r	43°44.67′N, 74°42.56′	620	*Picea rubens*, *F. grandifolia*, *B. alleghaniensis*
C P , t r	43°54.37′N, 71°36.47′	515	*P. rubens*, *B. alleghaniensis*
C P ,	43°54.33′N, 71°36.39′	500	*P. rubens*, *Tsuga canandensis*
HBEF, l r r 6	43°56.94′N, 71°44.08′	525	*F. grandifolia*, *B. alleghaniensis*
HBEF, r f r 6	43°57.43′N, 71°44.39′	775	*P. rubens*, *Betula papyrifera*, *B. alleghaniensis*
L B r r l t	43°05.35′N, 73°02.44′	810	*B. papyrifera*, *P. rubens*, *Abies balsamea*
L B r R t	43°03.42′N, 73°02.39′	740	*F. grandifolia*, *A. saccharum*
Mt. M f l , R B r	44°29.75′N, 72°47.85′	600	*A. saccharum*, *B. alleghaniensis*
Mt. M f l , F r	44°31.25′N, 72°48.94′	1110	*P. rubens*, *A. balsamea*
l r R g 9-C	44°29.54′N, 72°09.49′	560	*F. grandifolia*, *B. alleghaniensis*, *P. rubens*
N r , r r t M l A	41°58.09′N, 74°30.33′	840	*F. grandifolia*, *A. saccharum*
N r , m l M l C	41°57.94′N, 74°30.86′	730	*F. grandifolia*, *A. saccharum*



F r . 1. M l t f r r t .

(t 1 2 t >18% C) , t t r r 6 A
r 2 B r (1 r R r, 25 O t r
2000 N r 1 , 6 J, 2001). A r -
t 1 2 1 f 1 r 1
(t), r , r r 1 r r r t .
E t r t f 10 l , 1 t 25 l f 2 M
KCl (t r 1 t) 1 f t r
t t , 1 , (20 30). 1 r
t tt tl f r 15 , t t
t. , 1 r 1 t

N r , r r , r t r 1 , 1 t r H t t l. (1994).

2.5. Acetylene additions

At t 2001, , 1 f t , 1 r r , t t 1 , t t t 1 , t t r t r t r t r t r t (H K 1 , 1978). -ll 1 t r , 1 r 1 f - t 100 l , - t , t , 1 1 l f t - 1 t r , , t (t , t 30 f 1 ,). E t r t t 2 M KCl t r 1 t , t r t , r , t r t 10 f t r - 1 , ; f t r 1 , 2 4 7 . A f t r r t r , t t 1 , , t r t 12 °C. I r N, r , t t r t t r , r r .

2.6. Soil chemical analysis

1 H t 5 l , 1 10 l f 1 11^{-1} C Cl$_2$. lt tr t , r t r t t H, t t ff r t 1 , r l t tr , t f r tr t , 1 t . F r 1 C N 1 , t r , 1 (t t r t t) r , r , t t r , 0.125 C N r t 1 t 1 1 r(CE440, C tr 1 E Q t, L - ll, MA) , NI 1 1 G 1 t r Q 1 t tr l. , t 1 1 , - l, 1 r r (OM) t 1, r , r f L t (1963) , , t t , t t (A 1 , , F r t, N). 1 tr t t t r t l t , f ll 12 11^{-1} H$_2$ O$_4$ t r , OM t , t 1 , t . r t - l, 1 OM 1 , 1 t , t t 1 OM = 1.724 × C. ff t t , t (CEC) t r t B Cl$_2$ t f H r t D Q tt (1986), , r 2 - 1 . , 2 l , 1 r , r t r t 2 , t r , lt , l, t : 1 r t r t 11:1 60:1. E , 1 t (Al^{3+}, C $^{2+}$, M $^{2+}$, K$^+$, N $^+$, F $^{2+}$ M $^{2+}$) r t

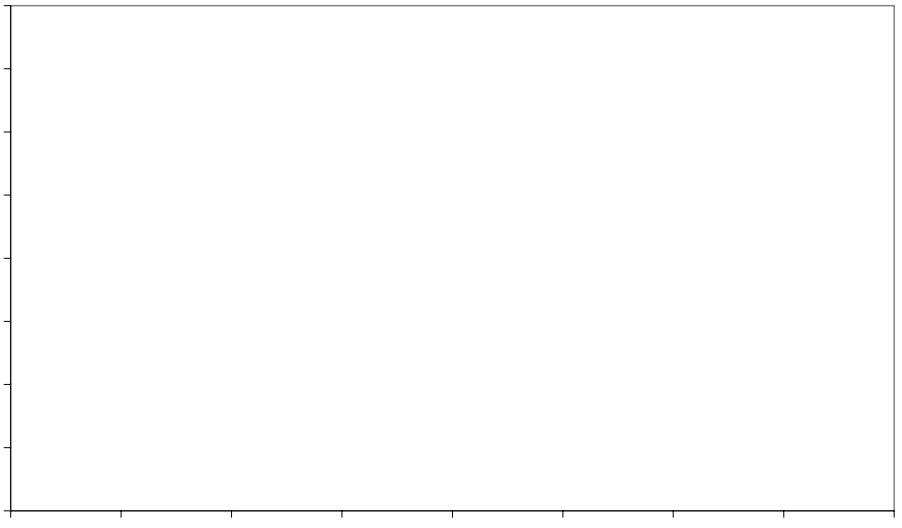
r l t , t . t
r t NH_4^+ , l t r r
(r , r l t , t) ,
t tr t r t t , l t r
t t , l t ll l r t f , , l
l .

3.2. Gross rate measurements

Gr r l t r t , , r t t -
t , l t t (H t t l., 1994) t t r ,
l ff r t t t l ,
r , l t 2000 r d 2001 (F , . 6).

t r t f rl t , t t
, r t 2001 l .

Gr tr t rt r 2000 l
r rl t l l r t t r r t
(t r H t, 1997; t tl r l ,
1999; L r t t l., 2001). C , t f NO_3^-
l r l t l l , , ll l t t , r
tr t r t (l 4). l , t
, , , t l t t f t tr t .
, r tr t r t r f t l r t
t t r t r , r t t r (F , . 7 ,



, rr t trt f NO_3^- l
, t t t l (F , . 9). I ,
, r t r 7- r t
r , trt f t 0.93 l
, $^{-1}$ t t f l , 0.92 l , $^{-1}$ f t r
7 f , t .It t r t , t t t t , f NH_4^+ NO_3^- t r l t l t t , r ,
t , t , r , r l f t r t t. Al , t NO_3^-
trt t r t t l -tr t
l , . . t r t r , t r
r r l l r r t f , t r , -
t . A t l , l f r l , l r t -
, , l t , t t t , t t r t
t r r f tr t f r t
l (D B r 9(B)109738 5208.42.9(605.2(1 .3(,)0( )10.9))-272.5 t

L
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L
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f r t t . l B l. B . 33, 1889 1901.
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M , r 52, 155 177.
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r l t f N r l t f r t l . l B l.
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tr , l , t , l t . F r
. 37, 45 53.